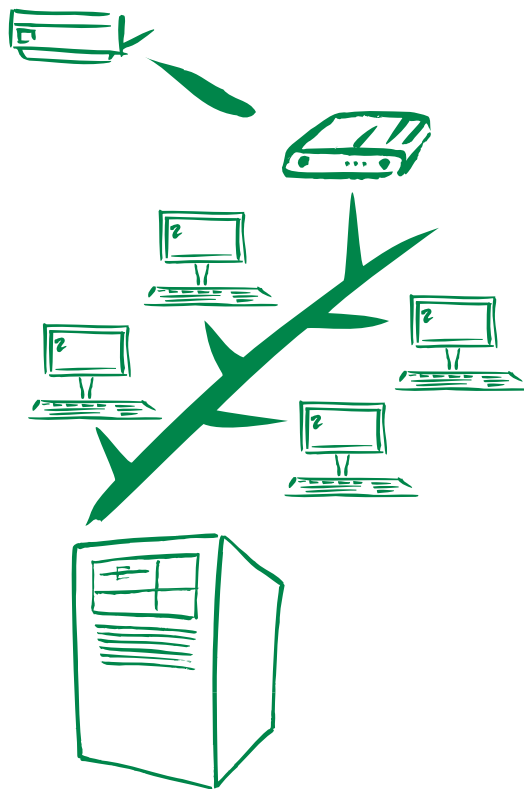


AXIS AX-3 Cobra+ Technical Reference



PREFACE

Please refer to the User's Manual for installation and basic configuration procedures.

Every care has been taken in the preparation of this manual; if you detect any inaccuracies or omissions, please inform us at the address supplied.

Axis Communications AB cannot be held responsible for any technical or typographical errors and reserves the right to make changes in this manual and to the firmware without prior notice.

About Axis

Axis Communications, founded in 1984, is one of the world's fastest growing companies in the printer interface, network print server and CD-ROM server market. The head quarters are located in Lund, Sweden, with subsidiaries in Beijing, Shanghai, Singapore, Tokyo, Hong Kong and Paris. Please refer to How to contact Axis on 163.

Axis Communications has a distributor network operating in more than 60 countries world-wide, marketing four product lines:

IBM Mainframe S/3x and AS/400 Printer Interfaces - These products include a wide range of plug-in interfaces and free standing box products such as the Cobra+ and the AFP IPDS-to-PostScript converter.

Network Print Servers - These intelligent Ethernet and Token Ring print servers support a wide range of LAN protocols. The AXIS NPS 530, 532, 550 and AXIS 150, 152, 540, 542, 560, 570 are Ethernet print servers, while the Axis NPS 630, 632, 650 and AXIS 640, 642, 660, 670 are Token Ring print servers.

CD-ROM Servers - Multiprotocol CD-ROM servers provide a flexible and cost-efficient solution for sharing CD-ROMs across the network. They are available in Ethernet and Token Ring versions.

Network Camera Server - The AXIS Neteye 200 Network Camera attaches directly to an Ethernet network. It supports TCP/IP and Internet-related protocols. This product replaces closed circuit video or PC with framegrabber, at a lower cost.

About this Manual

This manual contains detailed technical descriptions of the protocol converters and the IBM environment they are designed to operate in. The protocol converters covered by this manual belong to the Cobra family. They are: AX-3 Cobra+, AXIS OKI HD, AX-4039/2, AXIS Cobra+ OEM and the AXIS 330 Cobra. If you are not familiar with the basic functions of the protocol converters, refer to the User's Manual. The sections and appendices of this manual cover the following topics:

- **THE IBM 5250 ENVIRONMENT**
Physical connection, the twinax protocol and host configuration considerations.
- **IBM 5250 CONTROL CODES**
The SCS control codes supported by the protocol converter.
- **THEORY OF OPERATION**
Data flow chart and functionality of the protocol converter.
- **EXTENDED EMULATION MODE**
Functions beyond normal IBM printer emulation.
- **FEATURES AND FONTS**
How to get the most from the protocol converter.
- **PC-HOST SHARING**
Functionality and configuration.
- **SOLVING PROBLEMS**
How to solve common problems.
- **PRINTER DRIVERS**
All predefined printer drivers.
- **THE PARAMETER LIST**
A complete description of all parameters.
- **INTERNAL FUNCTIONS**
Internal functions available in the protocol converter.
- **CHARACTER TABLES**
National dependent EBCDIC tables and International Set 5.
- **THE FRONT PANEL**
- **COMPATIBILITY WITH OTHER PRODUCTS**
- **CABLES**
- **UPGRADING FIRMWARE**
- **TECHNICAL SPECIFICATIONS**
- **HOW TO CONTACT AXIS**
- **RELATED DOCUMENTATION**
- **GLOSSARY**
- **INDEX**

EMISSION NOTICES

USA

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference. Shielded cables should be used with this unit to ensure compliance with the Class A limits.

Europe



This digital equipment fulfils the requirements for radiated emission according to limit B of EN55022/1987, and the requirements for immunity according to EN50082-1/1992 residential, commercial, and light industry. (Compliance is not valid for unshielded network and printer cables.)

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AX-3 Cobra+ Technical Reference

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SECTION 1

THE IBM 5250 ENVIRONMENT

The following information applies when attaching the protocol converter to a 5250 Twinax host (System/36, System/38, or AS/400). For further details, refer to the IBM documentation listed in Appendix E.

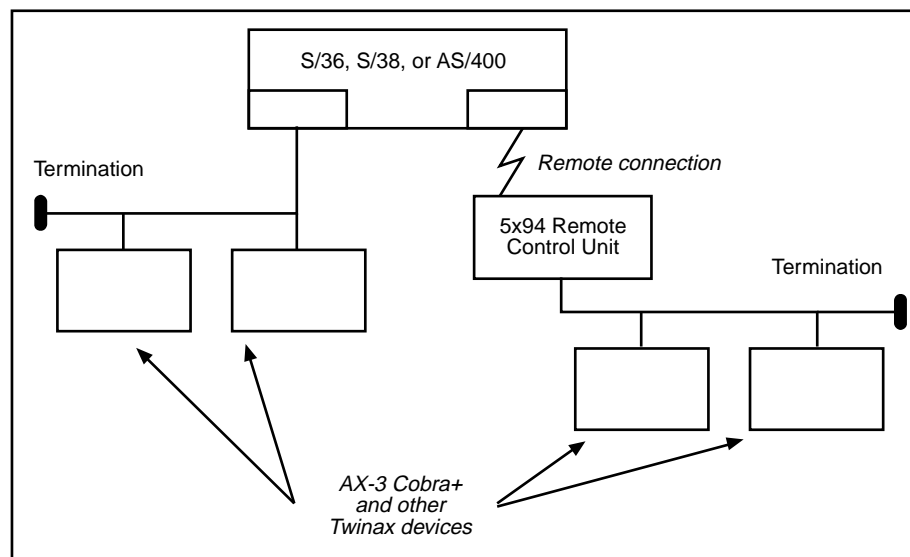
The protocol converter appears to the 5250 host as an original IBM Twinax printer.

Communications Methods

The 5250 host communicates with the protocol converter through either a local or remote controller as illustrated below.

A 5250 Workstation Controller built into the 5250 host is used for local attachment. Devices attached to a remote control unit behave as if they were attached directly to the host.

Local and remote attachment of devices to a 5250 host:



Physical Connection

Three different cabling methods can be used.

Cabling methods and characteristics:

Cabling Method	Characteristics
Standard Twinax Cable	Cable through (multi-drop) Max. length 1525 m Max. 11 cable junctions Termination after last unit
IBM Cabling System	Multi purpose: Can be used for Token Ring, Coax, etc. Cables routed as a star Electrically connected as cable through (multi-drop) Max. cable length 770 m Max. signal run length 1525 m Impedance matching device needed at both ends Termination after last unit Not to be mixed with standard twinax cable
Telephone Twisted Pair	Uses standard telephone wire Star configuration Max. cable length 305 m (depends on equipment used) Balun at each unit Termination at each unit

The Twinax Protocol

All communication between a twinax controller and a twinax printer is initiated by the controller. On request from the controller, a printer responds with the appropriate information.

Printer Poll Command

This command will initiate the transfer of two status words (frame 1 and frame 2) to the controller.

Printer response frame 1 and 2 (bit 0 MSB) to a printer poll command (transmission information excluded):

Frame	Bit	Information
Frame 1	Bit 4-6	Device Address
	Bit 7	Busy
	Bit 8	Line parity
	Bit 9	Unit not available
	Bit 10	Outstanding status
	Bit 11-13	Exception status
Frame 2	Bit 7	Invalid SCS control code
	Bit 8	Invalid SCS parameter
	Bit 9	Receive buffers full
	Bit 10	Print complete
	Bit 11	Cancel request
	Bit 12	Print mechanism not ready (5256 only)
	Bit 13	End of forms
	Bit 14	Graphic check (unprintable character)

Read Device ID Command

This command will make the addressed device respond with one word of information (frame 1).

Printer response frame 1 (bit 0 MSB) to a Read Device ID command (transmission information excluded):

Frame	Bit	Information
Frame 1	Bit 7, 8	Printer model (1, 2, 3, 4)
	Bit 9, 10	Device type (display, printer)
	Bit 11-14	Printer type (e.g. 5256, 5624, 5225, 4214, 3812/5219)

***Read Status
Command***

If the outstanding status bit was set in poll response frame 1, this command will initiate transfer of one word with additional information (frame 1). The table below lists the outstanding status information responded by a 3812/5219 and a 4214 model 2 printer respectively.

Read status response from a 3812/5219 and 4214 model 2 printer respectively
(responded value in hexadecimal representation):

Printer	Value	Information
3812/5219	\$11	Machine check
	\$47	Paper Jam
	\$66	Data stream exception class 1
	\$67	Data stream exception class 2
	\$68	Data stream exception class 3
	\$69	Data stream exception class 4
	\$81	Cover unexpectedly opened
4214 - 2	\$31,32,35	Print check

5250 Host Configuration

You have the choice of making a manual or automatic configuration. We strongly recommend manual configuration on AS/400 and S/38 when the protocol converter is configured for IBM 3812/5219 emulation.

The protocol converter is by default set to emulate the IBM 3812 model 1 printer with 5219 software. This setting is recommended for any 5250 system, as it makes the best use of the functionality of the connected printer.

You may change to IBM 5256 emulation to prevent the host from sending format settings (CPI, LPI, etc.). This is useful when you make extensive use of Extended Emulation to control the printer.

AS/400 Configuration

If you will configure for a number of protocol converter interfaces, or if you will use IBM 3812 emulation, manual configuration is recommended. Manual configuration is performed by using CRTDEVPR or WRKDEVD F6 (Create)

You may prior to configuration use PRTDEVADR to get a chart showing free port and switch setting combinations. Device type (TYPE) and Device model (MODEL) must match the settings of the protocol converter

The printers are listed in functionality order, with 5256 being the least functional (least advanced) of the IBM printer emulations.

Protocol converter printer emulation	Device type	Device model
IBM 5256	5256	1
IBM 5224	5224	1
IBM 5225	5225	1
IBM 4214	4214	2
*IBM 4230	4214	2
IBM 3812	3812	1

* Applies to the AXIS 330 Cobra only.

Note: Host Print Transform from OS/400 2.3 may be used, but then all printer emulation is done by the AS/400 and the protocol converter specific functions such as Extended Emulation will not work.

S/36 Configuration If you will configure for a number of protocol converter interfaces, manual configuration is recommended. Manual configuration is performed by using CNFIGSSP.

The device code must match the settings of the protocol converter

Protocol converter printer emulation	Device code
IBM 5256	PB
IBM 5224	PC
IBM 5225	PC
IBM 4214	PG
IBM 3812	PD
*IBM 4230	PG

*Applies to the AXIS 330 Cobra only.

S/38 Configuration If you will configure for a number of protocol converter interfaces, manual configuration is recommended. Manual configuration is performed by using CRTDEVD.

The device type (DEVTYPE) must match the settings of the protocol converter

Protocol converter printer emulation	Device Type
IBM 5256	5256
IBM 5224	5224
IBM 5225	5225
IBM 4214	4214
IBM 3812	3812
*IBM 4230	4214

* Applies to the AXIS 330 Cobra only.

SECTION 2

IBM 5250 CONTROL CODES

This Section describes the IBM SCS control codes supported by the AX-3 Cobra+. The control codes are described as emulated by the IBM 3812/5219 printer and the IBM 4214 model 2 printer.

The performance of the control codes is not fully described here and this presentation must only be used as an overview. For details, refer to the appropriate manual in Appendix G, Related Documentation.

Control codes for which no operation is performed, are not described in this Section.

The control codes have been divided into three groups:

- Control codes common to 3812/5219 emulation and 4214 emulation
- Additional control codes for 3812/5219 emulation
- Additional control codes for 4214 emulation

Summary of IBM SCS Control Codes

Control codes common to 3812/5219 emulation and 4214 emulation:

Code	Value	Description	Page
ATRN	03nn	ASCII Transparency	17
FF	0C	Form Feed	17
CR	0D	Carriage Return	17
NL	15	New Line	17
IRS	1E	Interchange Record Separator	17
LF	25	Line Feed	17
SHF	2BC1...	Set Horizontal Format	17
SVF	2BC2...	Set Vertical Format	18
SLD	2BC6...	Set Line Density	18
SGEA	2BC8...	Set Graphic Error Action	18
SCGL	2BD10381...	Set Char. Set through Local ID	18
SSLD	2BD20415...	Set Single Line Distance	19
SCD	2BD2042900...	Set Character Density	19
PPM	2BD2nn48...	Page Presentation Media	20
BEL	2F	Bell	20
AHPP	34C0...	Absolute Hor. Presentation Pos.	21
AVPP	34C4...	Absolute Vert. Presentation Pos.	21
RHPP	34C8...	Relative Hor. Presentation Pos.	21
RVPP	344C...	Relative Vert. Presentation Pos.	21
TRN	35nn	Transparent	21
SP	40	Space	21
RSP	41	Required Space	21
RHY	60	Required Hyphen	21
US	6D	Underscore	22
SHY	CA	Syllable Hyphen	22
NSP	E1	Numeric Space	22
EO	FF	Eight Ones	22

Additional control codes for 3812/5219 emulation:

Code	Value	Description	Page
HT	05	Horizontal Tab	23
RNL	06	Required New Line	23
SPS	09	Superscript	23
BS	16	Backspace	23
UBS	1A	Unit Backspace	23
WUS	23	Word Underscore	23
SCG	2BD10601...	Set GCGID through GCID	24
FSG	2BD10705...	Set FID through FGID	24
BES	2BD1038A...	Begin Emphasis	24
EES	2BD1nn8E...	End Emphasis	24
RLM	2BD2020B	Release Left Margin	24
SIL	2BD20307...	Set Indent Level	24
SLS	2BD20309...	Set Line Spacing	25
SIC	2BD20345...	Set Initial Conditions	25
STAB	2BD2nn01...	Set Horizontal Tab	25
JTF	2BD2nn03...	Justify Text Field	25
SJM	2BD2nn0D...	Set Justify Mode	26
SHM	2BD2nn11...	Set Horizontal Margins	26

Code	Value	Description	Page
SPPS	2BD2nn40...	Set Page Presentation Size	26
SVM	2BD2nn49...	Set Vertical Margins	26
SPSU	2BD2nn4C...	Set Printer Setup	27
SEA	2BD2nn85...	Set Exception Action	27
STO	2BD3nnF6...	Set Text Orientation	27
BUS	2BD4nn0	Begin Underscore	28
	A01...		
EUS	2BD4020E	End Underscore	28
BOS	2BD4nn72...	Begin Overstrike	28
EOS	2BD40276	End Overstrike	28
IRT	33	Index Return	28
NBS	36	Numeric Space	29
SBS	38	Subscript	29
IT	39	Indent Tab	29
RFF	3A	Required Form Feed	29
SUB	3F	Substitute	29

Additional control codes for 4214 emulation:

Code	Value	Description	Page
LAC	2BFE...	Load Alternate Characters	30

Control Codes Common to 4214 and 3812/5219 Emulation

ASCII Transparency (ATRN)

\$03	nn	d1 ... dn
------	----	-----------

Passes data directly to an attached printer. Used by PC Support and Host Print Transform.

Count (nn): Number of bytes following this command.

Data (d1...dn) : protocol converter ASCII data to be directly transferred to an attached printer.

Form Feed (FF)

\$0C

Moves the print position to the top line and left margin of the next page.

Carriage Return (CR)

\$0D

Moves the print position to the left margin of the current line.

New Line (NL)

\$15

Moves the print position to the left margin of the next line.

Interchange Record Separator (IRS)

\$1E

Same as New Line (NL).

Line Feed (LF)

\$25

Moves the print position to the current print position of the next line.

Set Horizontal Format (SHF)

\$2B	\$C1	nn	hh
------	------	----	----

Defines the maximum horizontal print position.

Count (nn): Number of bytes following this command plus one.

Maximum horizontal print position (hh): Defines the maximum horizontal print position.

Set Vertical Format (SVF)

\$2B	\$C2	nn	vv
------	------	----	----

Defines the maximum vertical print position.

Count (nn): Number of bytes following this command plus one.

Maximum vertical print position (vv): Defines the maximum vertical print position.

Set Line Density (SLD)

\$2B	\$C6	nn	ld
------	------	----	----

Defines the vertical distance between two lines.

Count (nn): Number of bytes following this command plus one.

Line distance (ld): Distance between lines in increments of 1/72th of an inch.

Set Graphic Error Action (SGEA)

\$2B	\$C8	nn	gg	uu
------	------	----	----	----

Defines the action to be taken when an unprintable character comes in the data stream.

Count (nn): Number of bytes following this command plus one.

Graphic Character (gg): Hexadecimal value for the character to be printed instead of the unprintable character.

Status Option (uu): Valid values are:

Value	Description
\$00, \$01, \$02	Continue printing as normal.
\$03, \$04	Stop printing and return status to the host.

Set Character Set through Local ID (SCGL)

\$2B	\$D1	\$03	\$81	id
------	------	------	------	----

Selects one of 18 coded character sets.

Character Set (id): Valid values are:

Value	Description	Value	Description
\$00	Multinational (4214)/International ASCII (3812/5219)	\$09	Italian
\$01	US English/Canadian	\$0A	Japanese English
\$02	German/Austrian	\$0B	US Eng./Canadian (4214)
\$03	Belgian	\$0C	Portuguese
\$04	Brazilian	\$0D	Spanish
\$05	Canadian French	\$0E	Spanish Speaking
\$06	Danish/Norwegian	\$0F	UK English
\$07	Finnish/Swedish	\$65	New Spanish Word Processing (3812/5219)
\$08	French	\$FF	(Default)

Set Single Line Distance (SSLD)

\$2B	\$D2	\$04	\$15	ldld
------	------	------	------	------

Sets the vertical distance between two lines.

Line distance (ldld): Distance between lines in increments of 1/1440th of an inch.

Set Character Density (SCD)

\$2B	\$D2	\$04	\$29	\$00	cp
------	------	------	------	------	----

Defines the number of characters to be printed per horizontal inch.

Character per inch (cp): Valid values are:

Value	Description
\$00	No change to present density
\$05	5 characters per inch (4214)
\$0A	10 characters per inch
\$0B	Proportional spacing (3812/5219)
\$0C	12 characters per inch
\$0F	15 characters per inch
\$10	16,7 characters per inch (4214)
\$FF	10 characters per inch

Page Presentation Media (PPM)

\$2B	\$D2	nn	\$48	xxxx	fc	sd	do	dd	qq	dx
------	------	----	------	------	----	----	----	----	----	----

Specifies presentation media device settings.

Count (nn): Number of bytes following this command plus one.

Reserved (xxxx): These two bytes are ignored.

Forms Control (fc): Valid values are:

Value	Description
\$00	No change in the present forms selected
\$01	Selection of paper as the forms to use
\$02	Selection of envelopes as the forms to use

Source Drawer (sd): Valid values are:

Value	Description
\$00	No change of source drawer selection
\$01	Selection of source drawer 1
\$02	Selection of source drawer 2
\$03	Selection of source drawer 3
\$04	Selection of source drawer 4

Destination Drawer Offset (do): Valid range is \$00 – \$FF. If *do* is zero, the output will not be jogged. Any non-zero value will jog the output, provided that one or more pages have been printed since the last non-zero *do*.

Destination Drawer (dd): A change of this value causes the IBM 3812/5219 to jog the output tray. The value is ignored by an IBM 4214 printer.

Quality (qq): Valid values are:

Value	Description (3812)	Value	Description (4214)
\$00	No change	\$00	No change
\$01	Computer output reduction	\$01	Data processing quality
\$02	No computer output reduction	\$02	Near letter quality
\$03	No computer output reduction	\$03	Fast draft
		\$FF	Use power on default quality

Duplex (dx) (3812 emulation): Valid values are:

Value	Description
\$00	No change regarding simplex/duplex printing
\$01	Simplex printing
\$02	Duplex printing
\$03	Tumbled duplex printing

Bell (BEL)

\$2F

Sounds the audible alarm.

Absolute Horizontal Presentation Position (AHPP)

\$34	\$C0	ah
------	------	----

Moves the horizontal print position.

Absolute Horizontal Position (ah): The horizontal position.

Absolute Vertical Presentation Position (AVPP)

\$34	\$C4	av
------	------	----

Moves the vertical print position.

Absolute Vertical Position (av): The vertical position.

Relative Horizontal Presentation Position (RHPP)

\$34	\$C8	rh
------	------	----

Moves the print position horizontally relative to its present position.

Relative Horizontal Position (rh): The relative horizontal print position movement.

Relative Vertical Presentation Position (RVPP)

\$34	\$4C	rv
------	------	----

Moves the print position vertically relative to its present position.

Relative Vertical Position (rv): The relative Vertical print position movement.

Transparent (TRN)

\$35	nn
------	----

Allows printing of characters with values of \$00 through \$3F.

Count (nn): Number of bytes following this command.

Space (SP)

\$40

Causes a horizontal displacement of one column width to the right.

Required Space (RSP)

\$41

Causes a horizontal displacement of one column width to the right. The displacement cannot be increased during justification of text.

Required Hyphen (RHY)

\$60

Prints the hyphen character.

Underscore (US)

\$6D

Prints the underscore character.

Syllable Hyphen (SHY)

\$CA

Prints the hyphen character.

Numeric Space (NSP)

\$E1

Causes a horizontal displacement of one column width to the right. The displacement cannot be increased during justification of text.

Eight Ones (EO)

\$FF

The IBM 4214 printer prints this character as a blank unless it has been programmed by the load alternate character command.

Additional Control Codes for 3812/5219 Emulation

Horizontal Tab (HT)

\$05

Moves the print position to the right one tab stop.

Required New Line (RNL)

\$06

Same as New Line (NL).

Superscript (SPS)

\$09

Causes an upward displacement of one-half the single line distance.

Backspace (BS)

\$16

Causes the print position to be changed to the left a distance equal to the current character width.

Unit Backspace (UBS)

\$1A

When in proportional spacing mode, this command causes a backspace of 1/60th of an inch. Otherwise it performs no operation.

Word Underscore (WUS)

\$23

Causes the word preceding the command to be underscored.

Set GCGID through GCID (SCG)

\$2B	\$D1	\$06	\$01	gcgc	cpcp
------	------	------	------	------	------

Selects the global character set ID.

Graphic Character Set Global id (gcgc): This two-byte value is ignored.

Code Page Global id (cpcp): A two byte value specifying the code page global ID (CPGID).

Set FID through FGID (FSG)

\$2B	\$D1	\$07	\$05	gfgf	fwfw	fa
------	------	------	------	------	------	----

Selects the global font ID, font width and font attributes.

Font Global id (gfgf): A two byte value specifying the font global ID (FGID).

Font Width (fwfw): A two byte value specifying the font width to be used for printing text.

Font Attribute (fa): The parameter is ignored.

Begin Emphasis (BES)

\$2B	\$D1	nn	\$8A	ca
------	------	----	------	----

This command begins emphasizing text by printing with twice the current stroke weight.

Count (nn): Number of bytes to follow (including the count byte).

Character Appearance (ca): The parameter is ignored.

End Emphasis (EES)

\$2B	\$D1	nn	\$8E	xx
------	------	----	------	----

This command ends emphasizing text. The xx parameter is reserved.

Count (nn): Number of bytes to follow (including the count byte).

Release Left Margin (RLM)

\$2B	\$D2	\$02	\$0B
------	------	------	------

If issued immediately after a New Line (NL) command, it constitutes a paragraph end.

Set Indent Level (SIL)

\$2B	\$D2	\$03	\$07	il
------	------	------	------	----

Specifies the indent tab level.

Indent Level (il): The number of tab stops to the right of the left margin at which the indent level is to be set.

Set Line Spacing (SLS)

\$2B	\$D2	\$03	\$09	ls
------	------	------	------	----

Specifies multiple line spacing as the number of half lines to be advanced when one of the commands New Line, Required New Line, Line Feed, Interchange Record Separator or Index Return, is performed.

Line Spacing (ls): The number of half lines to advance.

Set Initial Conditions (SIC)

\$2B	\$D2	\$03	\$45	is
------	------	------	------	----

Sets the formatting parameters to their initialization values.

Initialization Set (is): Valid values are:

Value	Description
\$01	Initialize for Word Processing documents (portrait orientation, FGID 87)
\$FF	Initialize for Data Processing documents (COR)

Set Horizontal Tab (STAB)

\$2B	\$D2	nn	\$01	ff	ht ₁ ...ht _n
------	------	----	------	----	------------------------------------

Count (nn): Number of bytes following this command plus one.

Format (ff): Valid values are:

Value	Description
\$00	The tab stop values specify columns relative to the left margin
\$01	The tab stop values specify positions in increments of 1/1440th of an inch relative to the left margin

Horizontal Tab (ht): Each tab stop is specified by three bytes:

Byte	Description
0	Alignment. This byte is ignored
1,2	Tab stops. A two byte value specifying a tab stop position

Justify Text Field (JTF)

\$2B	\$D2	nn	\$03	rere	pr
------	------	----	------	------	----

Specifies justification of a field of text and the horizontal position to which the text is justified.

Count (nn): Number of bytes following this command plus one.

Right Edge (rere): The horizontal position to which the field is to be justified. The two-byte value is specified in 1/1440th of an inch and relative to the left margin.

Percent Rule (pr): The percentage rule of justification. The IBM 3812/5219 always use full justification (100%).

Set Justify Mode (SJM)

\$2B	\$D2	nn	\$0D	st	pr
------	------	----	------	----	----

Specifies justification of all lines of text.

Count (nn): Number of bytes following this command plus one.

State (st): Valid values are:

Value	Description
\$00	Inactivate justification
\$01	Activate justification

Percent Rule (pr): The percentage rule of justification. The IBM 3812/5219 always use full justification (100%).

Set Horizontal Margins (SHM)

\$2B	\$D2	nn	\$11	lmlm	rmrm
------	------	----	------	------	------

Specifies the left and right margin in 1/1440th of an inch.

Count (nn): Number of bytes following this command plus one.

Left Margin (lmlm): The leftmost print position relative to the physical left margin.

Right Margin (rmrm): The rightmost print position relative to the physical left margin.

Set Presentation Page Size (SPPS)

\$2B	\$D2	nn	\$40	wdwd	dpdp
------	------	----	------	------	------

Specifies the width and the depth of the physical page in 1/1440th of an inch.

Count (nn): Number of bytes following this command plus one.

Width (wdwd): Two bytes defining page width.

Depth (dpdp): Two bytes defining page depth.

Set Vertical Margins (SVM)

\$2B	\$D2	nn	\$49	tmtm	bmbm
------	------	----	------	------	------

Specifies the top and bottom margin in 1/1440th of an inch.

Count (nn): Number of bytes following this command plus one.

Top Margin (tmtm): The distance from the top edge of the page to the base line of the first print line.

Bottom Margin (bmbm): Ignored.

Set Printer Setup (SPSU)

\$2B	\$D2	nn	\$4C	xx	pf	xx	si
------	------	----	------	----	----	----	----

Specifies the paper feed unit and print setup to be used.

Count (nn): Number of bytes following this command plus one.

Reserved (xx): This byte is ignored.

Paper Feed (pf): Valid values are:

Value	Description
\$00	No change to the paper feed
\$01	Select manual feed
\$02	Select tractor feed
\$03	Select automatic cut sheet feed

Reserved (xx): This byte is ignored.

String (si): A string of maximum 60 bytes. The two first ones are converted to decimal values and presented on the printer operator panel.

Set Exception Action (SEA)

\$2B	\$D2	nn	\$85	ecac
------	------	----	------	------

Specifies the action to be taken on the detection of the text data stream exception conditions.

Count (nn): Number of bytes following this command plus one.

Exception Action (ecac): Paired one byte numbers specifying the action to be taken on the detection of the data stream exception conditions.

Set Text Orientation (STO)

\$2B	\$D3	nn	\$F6	crcr	prpr
------	------	----	------	------	------

Controls print orientation.

Count (nn): Number of bytes following this command plus one.

Character Rotation (crcr): This two-byte value is ignored.

Page Rotation (prpr): Valid values are:

Value	Description
\$0000	Normal upright orientation (Portrait)
\$2D00	Landscape left (270 degrees orientation)
\$5A00	Portrait upside down (180 degrees orientation)
\$8700	Landscape right (90 degrees orientation)
\$FFFE	Computer Output Reduction (COR)
\$FFFF	Default (orientation based on SPPS)

Begin Underscore (BUS)

\$2B	\$D4	nn	\$0A	\$01	bp
------	------	----	------	------	----

Activates the underscore function.

Count (nn): Number of bytes following this command plus one.

Bypass (bp): Valid values are:

Value	Description
\$00	Underscore all graphic characters
\$80	Underscore all graphic characters except space and relative horizontal positioning control

End Underscore (EUS)

\$2B	\$D4	\$02	\$0E
------	------	------	------

Deactivates the underscore function.

Begin Overstrike (BOS)

\$2B	\$D4	nn	\$72	ch	bp	gcgc	cpcp
------	------	----	------	----	----	------	------

Activates the overstrike function.

Count (nn): Number of bytes following this command plus one.

Character (ch): The character code to be used as the overstrike character.

Bypass (bp): Valid values are:

Value	Description
\$00	Overstrike all graphic characters
\$80	Overstrike all graphic characters except space and relative horizontal positioning control
Other	Identifies the graphic character not to be overstruck

Graphic Character Set Global ID (gcgc): This two-byte value is ignored.

Code Page Global ID (cpcp): This two-byte value is ignored.

End Overstrike (EOS)

\$2B	\$D4	\$02	\$76
------	------	------	------

Deactivates the overstrike function.

Index Return (IRT)

\$33

Same as Required New Line (RNL).

Numeric Backspace (NBS)

\$36

Same as Backspace (BS).

Subscript (SBS)

\$38

Causes a downward displacement of one-half the single line distance.

Indent Tab (IT)

\$39

Moves the print position to the right one tab stop and sets the left margin to this position.

Required Form Feed (RFF)

\$3A

Moves the print position to the top line and left margin of the next page.

Substitute (SUB)

\$3F

The substitute character (hyphen) is printed.

Additional Control Codes for 4214 Emulation

Load Alternate Characters (LAC)

\$2B	\$FE	nn	mm	ee	i1 ... in
------	------	----	----	----	-----------

Loads character images at specified EBCDIC character code points.

Count (nn): Number of bytes following this command plus one.

Matrix Size (mm): Valid values are:

Value	Description
\$01	Character matrix size 8 high by 9 wide
\$02	Character matrix size 8 high by 10 wide

EBCDIC Character (ee): EBCDIC character code point for the character pattern defined in i1 to in. One code point must be specified for each defined character.

Character Matrix Data (i1...in): A field of the vertical slice data that defines the character pattern.

SECTION 3

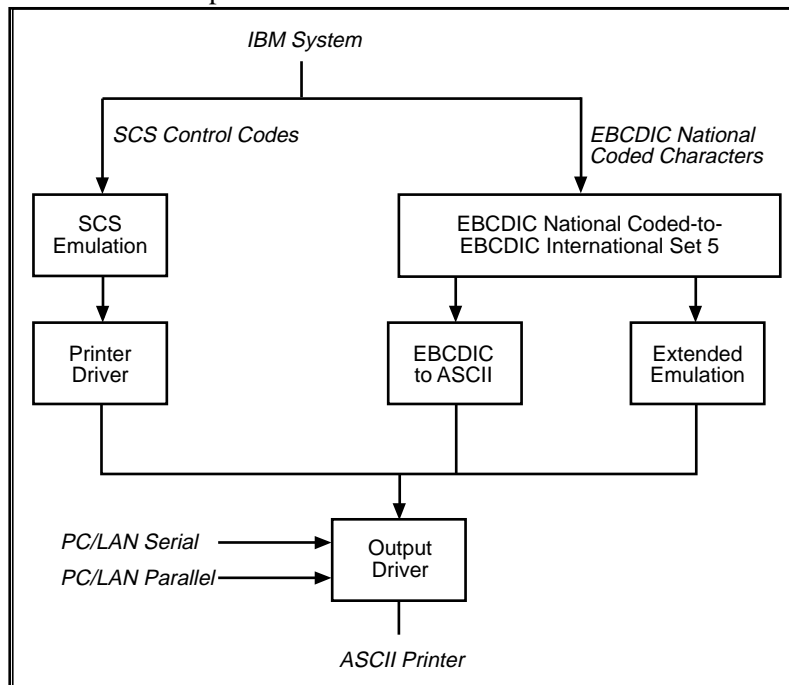
THEORY OF OPERATION

The protocol converter receives IBM SCS (System network architecture Character String) character codes and control commands, and translates them into ASCII character codes and control commands which are sent to an attached printer.

Data Flow Chart

The basic data flow is shown in the following diagram.

Data flow in the protocol converter:



<i>EBCDIC National Coded-To-EBCDIC International Set 5</i>	SCS characters are coded in EBCDIC (Extended Binary-Coded Decimal Interchange Code) of which a number of national dependent versions exist. The protocol converter internally works with EBCDIC International Set 5 (see section 11, page 132) and of this reason, all printable characters (\$40 - \$FF) coming from the IBM system are translated to International Set 5.
<i>EBCDIC International Set 5-To-ASCII</i>	After a printable character has been translated to International Set 5, it is normally translated to the equivalent ASCII character.
<i>Extended Emulation</i>	Some predefined printable characters (see Section 4, page 35) can be used to process non-IBM functions. These characters are not translated to ASCII, but used to control Extended Emulation Mode.
<i>SCS Emulation</i>	During normal operation the protocol converter emulates an IBM printer, <i>i.e.</i> it not only translates EBCDIC characters to ASCII, but it also translates SCS control codes to ASCII data sequences.
<i>Printer Driver</i>	The Printer Driver is a subset of the parameter list (see Section 8, page 77 and Section 9, page 79) which contains all ASCII sequences that are used by the SCS emulation to translate SCS control codes to ASCII data.
<i>Output Driver</i>	The output driver transfers the ASCII character codes and control commands to an attached printer using either the parallel (centronics) or serial (RS-232)* interface. The interface type is automatically determined by the type of printer cable installed. The output driver also controls the PC-host sharing feature*.

*** Does not apply to the AXIS 330 Cobra.**

SECTION 4

EXTENDED EMULATION MODE

During normal mode of operation the protocol converter, together with your printer, emulates the IBM printer selected in your configuration. In addition, the Extended Emulation Mode gives you access to functions not available in standard IBM printer. These functions are:

- Hex Transparency
- Configuration from the System
- Internal Function Execution
- User Definable Strings

The following parameters control Extended Emulation Mode:

#040 Escape Character (ESC)

#041 Transparency Lead-In Sequence (TLI)

#042 Configuration Lead-In Sequence (CLI)

#043 Transparency/Configuration Trailer Sequence (TCT)

#044 Extended Emulation Control Sequence (EECS)

All parameters and internal functions are further described in Section 9 and 10.

Note: Extended emulation will not work if you have set Host Print Transform in your host configuration. (See page 34.)

Using Extended Emulation Mode

To use the Extended Emulation Mode functions, the Extended Emulation Mode has to be activated. This is done by inserting the enter Extended Emulation Mode sequence in your document. Any number of extended emulation functions can then be used before Extended Emulation Mode is deactivated using the exit Extended Emulation Mode sequence.

Example:

```
&&??%P      (enter Extended Emulation Mode) Note 1
%P           (Configuration Lead-In sequence See page 36)
=120,"UDS STRING 0", $0C
              (program parameter #120. See page 36)
=206         (internal function call. See page 37)
%           (Transp./Config. Trailer Sequence See page 36)
%0C         (Single byte transparency. See page 38)
%%"DATA"0C% (Multi-byte transparency. See page 39)
%z0         (Using User Defined Strings. See page 42)
&&??000     (exit Extended Emulation Mode) Note 2
```

- Notes:*
1. This is the default enter Extended Emulation Mode sequence. The sequence can be altered if needed. See also page 35.
 2. This is the default exit Extended Emulation Mode sequence. The sequence can be altered if needed. See also page 35.

Enter Extended Emulation Mode

The Extended Emulation Mode is entered by inserting the enter Extended Emulation Mode sequence into your document.

Syntax: `<EECS><Char. 1><Char. 2><Char. 3>`

- `<EECS>` is the Extended Emulation Control Sequence (Parameter #044). The default sequence is '&&??'.
- `<Char.1>`, `<Char. 2>` and `<Char. 3>` are three printable characters to be used for subsequent extended emulation functions.

Result:

Param.	Title	Contents
#040	Escape Character	<code><Char. 1></code>
#041	Transparency Lead-In Sequence	<code><Char. 1><Char. 2></code>
#042	Configuration Lead-In Sequence	<code><Char. 1><Char. 3></code>
#043	Transp./Config. Trailer Sequence	<code><Char. 1></code>

Note: The characters `<Char. 1>`, `<Char. 2>` and `<Char. 3>` must be different from the characters in the `<EECS>` sequence.

The example below shows how to enter Extended Emulation Mode.

Example: `&&??%P`

Result:

Param.	Title	Contents
#040	Escape Character	<code>\$6C</code> (%)
#041	Transparency Lead-In Sequence	<code>\$6C \$6C</code> (%%)
#042	Configuration Lead-In Sequence	<code>\$6C \$D7</code> (%P)
#043	Transp./Config. Trailer Sequence	<code>\$6C</code> (%)

Exit Extended Emulation Mode

To exit the Extended Emulation Mode and to resume normal emulation, the exit Extended Emulation Mode sequence is used.

Syntax: `<EECS>000`

- `<EECS>` is the Extended Emulation Control Sequence (Parameter #044). The default sequence is '&&??'.

The example below shows how Extended Emulation Mode can be exited using the default EECS.

Example:

Result: &&??000

The parameters for Extended Emulation Mode will be set to their default values (see Section 9) and the complete parameter list will be saved as well as the EBCDIC-To-ASCII Character Translation Table.

Param.	Title	Contents
#040	Escape Character	\$00
#041	Transparency Lead-In Sequence	<empty>
#042	Configuration Lead-In Sequence	<empty>
#043	Transp./Config. Trailer Sequence	<empty>

Configuration from the System

This function enables you to configure the protocol converter without using the Configuration from a Terminal (described in the User's Manual). The configuration is done by including parameter programming commands and internal function calls in your document. To use these commands the Extended Emulation Mode has to be invoked (see page 34).

Syntax:

```
<CLI>=<Parameter/Funct.1>[=<Parameter/Funct.2>...=<Parameter/Funct.n>]<TCT>
```

- <CLI> is the configuration Lead-In sequence (parameter #042). The default sequence is '%P'.
- <Parameter/Funct._n> are parameter programming commands or internal function calls.
- <TCT> is the Transparency/Configuration Trailer Sequence (parameter #043). The default sequence is '% '.

Parameter Programming

The parameter programming command consists of an equal sign, a parameter number, a comma, and a parameter value. The command is valid only within a configuration sequence.

Syntax: <CLI>=<Parameter Number>,<Parameter Value or String><TCT>

Any number of parameters can be programmed before the TCT stop sequence.

Example:

```
%P=54,4=120, "UDS STRING 0", $0C % (program parameters #054 and #120
```

Result: Parameter #054 will be set to 4 and parameter #120 will contain the ASCII codes for the characters in the text 'UDS STRING 0' followed by the ASCII control code for form feed.

- Notes:**
1. To program parameters Extended Emulation Mode has to be active. See page 33.
 2. All IBM control codes are ignored during Configuration from the System.
 3. The parameter number must always be decimal.

Internal Function Calls

The internal function call consists of an equal sign, a function number, a comma, and a function parameter value. The command is valid only within a configuration sequence. The internal functions are described in Section 10, page 116.

Syntax: `=<Function Number>,<Argument (not all functions)>`

Any number of functions can be called before the TCT stop sequence.

Example: `%P=205=206 %(call functions #205 and #206)`

Result: All parameters and the EBCDIC-To-ASCII Character Translation Table will be saved in permanent memory and a software reset will be performed.

- Note:**
1. To call internal functions Extended Emulation Mode has to be active. See page 33.
 2. All IBM control codes are ignored during execution of internal functions.

Data Representation and Delimiters during Configuration

Parameter and function numbers must always be specified as decimal values. Other data can use alternative representations but must, during Configuration from the System, be separated by a delimiter. Data representation and delimiters during Configuration:

Data Type/Delimiter	Character <i>Note 1</i>	Example Of Use
Parameter Number	= (\$7E) # (\$7B) § (\$5B)	=120 #120 §120
Decimal Value	Note 2	12
Hexadecimal Value	\$ (\$5B) ¤ (\$9F)	\$0C or \$0c ¤0C or ¤0c
Binary Value	* (\$5C)	*00100111
Text String (ASCII char)	' (\$7D) " (\$7F)	'ASCII CODED TEXT' "ASCII CODED TEXT"
Text String (EBCDIC char)	/ (\$61) % (\$6C)	/EBCDIC CODED TEXT/ %EBCDIC CODED TEXT%
'Yes' Value	y (\$A8) Y (\$E8)	y Y
'No' Value	n (\$95) N (\$D5)	n N
Comment (start)	((\$4D)	(comments will be ignored)
Comment (stop)	) (\$5D)	(comments will be ignored)
Delimiter	SP(\$40) , (\$6B) . (\$4B) : (\$7A) ; (\$5E)	=120 "DATA" =120,"DATA" =120."DATA" =120:"DATA" =120;"DATA"

**Multi-Byte
Transparency**

Multi-Byte Transparency passes through any number of bytes to the printer. Once Extended Emulation Mode has been entered (see page 33), the function is controlled by the Transparency Lead-In Sequence and the Transparency/Configuration Trailer Sequence.

Syntax:

<TLI><Hexadecimal Value ₁ >[<Hexadecimal Value ₂ >...<Hexadecimal Value _n >]<TCT>
--

or

<TLI>"<sequence of ASCII characters>"<TCT>
--

- <TLI> is the Transparency Lead-In Sequence (parameter #041). The default sequence is ‘%%’
- <TCT> is the Transparency/Configuration Trailer Sequence (parameter #043). The default sequence is ‘%’

Any number of hexadecimal values and sequences of ASCII characters can be sent to the printer before the <TCT> stop sequence.

Example 1: %%444154410C%

Example 2: %% "DATA" 0C%

Result: The text ‘DATA’ followed by a form feed will be printed on the attached printer.

- Notes:*
1. To use transparency Extended Emulation Mode has to be active. See page 33.
 2. During Multi-Byte Transparency, the hexadecimal values shall not be preceded by a ‘\$’ or ‘¤’ character.
 3. All IBM control codes are ignored during Multi-Byte Transparency.

**Sending Control
Commands to the
printer**

The Multi Byte Transparency function can also be used to send any control command sequences stored in the parameter list to the printer by referring to their parameter numbers. This function provides a versatile method of printer control, independent of the selected printer driver.

Syntax:

<TLI>=<Parameter No. ₁ >[=<Parameter No. ₂ >...=<Parameter No. _n >]<TCT>

- <TLI> is the Transparency Lead-In Sequence (parameter #041). The default sequence is ‘%%’
- <TCT> is the Transparency/Configuration Trailer Sequence (parameter #043). The default sequence is ‘%’

Example: %% "DATA" =62%

Result: The text 'DATA' followed by the contents of parameter #062 (Form Feed) will be printed on the attached printer.

- Notes:*
1. To send commands Extended Emulation Mode has to be active. See page 33.
 2. The parameter number must always be decimal.

**Data
Representation
and Delimiters
during Multi-Byte
Transparency**

Parameter numbers must always be specified as decimal values. Pass through data can be specified as either hexadecimal values or as ASCII data. Delimiters can be used during Multi-Byte Transparency but are not mandatory.

Data Type/Delimiter	Character Note 1	Example Of Use
Parameter Number	= (\$7E)	=120
	# (\$7B)	#120
	§ (\$B5)	§120
Hexadecimal Value	Note 2	0C or 0c
Text String (ASCII char)	' (\$7D)	'ASCII CODED TEXT'
	" (\$7F)	"ASCII CODED TEXT"
Delimiter	SP(\$40)	=120 "DATA"
	, (\$6B)	=120,"DATA"
	. (\$4B)	=120."DATA"
	: (\$7A)	=120:"DATA"
	; (\$5E)	=120;"DATA"

- Notes:*
1. Character codes are the EBCDIC International Set 5 codes that are valid. Make sure that you have selected a System Language matching your host settings.
 2. No character should be used to denote a hexadecimal value.

***Prescribe
Transparency***

For use of Prescribe sequences on Kyocera printers, a special transparency mode is available. This mode is selected by setting parameter #041 (Transparency Lead-In Sequence) to \$4F, \$D9, \$4F ('!R!'). The special transparency mode is triggered by the text sequence '!R!' and is terminated by any one of the following sequences:

```
EXIT;  
EXIT,E;  
EXIT, E;  
exit;  
exit,e;  
exit, e;
```

The start and stop sequences will be passed to the printer as ASCII text and the characters in-between will be converted to their corresponding code in ASCII before being sent to the printer.

Note: All IBM control codes are ignored during Prescribe Transparency.

***FormsXpress
Transparency***

The following set-up of the extended emulation parameters is required to enable printing from FormsXpress. Parameter #040 (Escape character) should be set to \$BA ('¬'), #041 (Transparency Lead-In sequence) to \$BA \$BA ('¬¬') and #043 (Transparency/Configuration Trailer Sequence) to \$5B ('\$').

- Notes:*
1. When #040 is set to \$BA, the sequences '¬R', '¬I', and '¬S' have special meaning to the extended emulation handler.
 2. All IBM control codes are ignored during FormsXpress Transparency.
 3. The parameters controlling simulated bold (#136, Offset for Bold and #137, Reset Offset for Bold) should be cleared.

User Definable Strings

There are ten parameters in the parameter list (parameter #120 to #129, the User Definable Strings, UDS) that can be programmed by the user to contain arbitrary strings. The User Definable Strings are programmed using the standard Parameter Programming (see page 36). To send the stored strings to the printer the method described on page 39 can be used. There is also an additional syntax for sending the User Definable strings to the printer:

Syntax: `<ESC>z<UDS String Number>`

or

`<ESC>Z<UDS String Number>`

- `<ESC>` is the Escape Character, (parameter #040). The default Escape Character is '% '.
- `<UDS string number>` is a decimal value in the range 0 to 9 that refers to one of the strings in parameter #120 to #129.

Example: `%z0Normal Text%Z1`

Result: The contents of parameter #120 will be sent to the printer. Then 'Normal Text' is printed and finally the contents of parameter #121 is sent to the attached printer.

Note: To send strings Extended Emulation Mode has to be active. See page 34.

SECTION 5

FEATURES AND FONTS

By configuring the protocol converter, a number of features can be accessed. This Section describes the most commonly used features. Note that some features only apply to either 5219 emulation or 4214 emulation.

Redefinition of the Lead-In and Trailer Sequences

The redefinition is done using either Configuration from the System or using Configuration from a Terminal (the User's Manual). The Transparency Lead-In Sequence (parameter #041) and Trailer Sequence (parameter #043) are redefined by programming the appropriate parameters following the syntax described page 36.

Example:

%P	
=41 , / ! ? < /	Note 1
=43 , / > & /	Note 1
=205	Note 2
> &	Note 3

- Notes:*
1. The characters in this parameter are EBCDIC characters and therefore the '/' character is used for programming (see page 37).
 2. Function #205 saves all parameters permanently.
 3. The new Trailer Sequence must be used to exit parameter programming.
 4. Extended Emulation Mode has to be active. See page 33.

Result:

Param.	Title	Contents
#040	Escape Character	\$6C (%)
#041	Transparency Lead-In Sequence	\$4F \$6F \$4C (!?<)
#042	Configuration Lead-In Sequence	\$6C \$D7 (%P)
#043	Transp./Config. Trailer Sequence	\$6E \$50 (>&)

Changing ASCII Character Translation Table

When doing the character conversion from EBCDIC International Set 5 to ASCII character codes, the protocol converter uses the translation table it has been configured for.

Even though the Printer Driver selection includes a suitable character translation table, there are some predefined tables that can be explicitly selected. For modification of the selected translation table, refer to page 46.

Translation Table
Selection
(3812/5219
Emulation Only)

A selection is made by programming parameter #054 (ASCII Character Set). Valid selections are 1 to 5, representing one of the translation tables listed in section 9, page 79.

Once the selection has been done, the ASCII character set will be automatically selected in the printer.

The selection in parameter #054 will normally affect all fonts. However, page 57 is a description of how the ASCII character translation table can be changed for certain fonts only.

Example:

%P	
=54,4	Note 1
=205=206	Note 2
%	

- Notes:
1. Parameter #054 is used for ASCII character set selection and 4 selects PC-850.
 2. Function #205 saves the change permanently and #206 performs a software reset.
 3. Extended Emulation Mode has to be active. See page 33.

Result: The ASCII characters printed will be coded according to PC-850.

*Translation Table
Selection (4214
Emulation Only)*

A selection is made by programming parameter #015 (ASCII Character Set). Valid selections are 0 to 12, representing one of the translation tables listed in section 9, page 79.

The ASCII character set will not be automatically selected in the printer. The recommended method when changing ASCII character set in the protocol converter is to update the power up sequence (parameter #090) to select the new ASCII character set in the printer. After each power on, the correct character set will be activated automatically.

Note: Some printer drivers also require the CPI Strings #80 - #89 updating.

Example:

%P
=15,11
=90,\$1B,\$45
\$1B,\$26,\$6C,\$32,\$45
\$1B,\$26,\$6C,\$30,\$4C
\$1B,\$28,\$31,\$32,\$55
=205=206
%

Note 1

Note 2

Note 3

- Notes:*
- 1. Parameter #015 is used for ASCII character set selection and 11 selects PC-850.
 - 2. This power up sequence assumes the attached printer to be HP LaserJet compatible with support for PC-850. Besides the reset and margin setting commands, the power up sequence is programmed with the sequence for selection of character set PC-850 (\$1B \$28 \$31 \$32 \$55).
 - 3. Function #205 saves the change permanently and #206 performs a software reset.
 - 4. Extended Emulation Mode has to be active. See page 33.

Result: At each power up PC-850 will be selected in the printer and the protocol converter will translate the EBCDIC coded characters to equivalent ASCII characters coded according to the PC-850 character set.

Modification of the Character Translation Table

Normally, there is no need to modify the EBCDIC International Set 5-To-ASCII Character Translation Table since the table activated by the System Language and Printer Driver selections is designed to produce the same printouts as the emulated IBM printer. If you anyway need to print characters not available in the standard translation table, this Section describes how to do the necessary modifications.

The translation table translates printable characters from EBCDIC International Set 5 to ASCII character codes. The ASCII character codes that are being produced depends on the ASCII character set, selected by the current Printer Driver or explicitly by the user, see page 44.

Example: If we have an application using the characters '(' and ')' (EBCDIC code \$4D and \$5D) but instead of these want to print the characters '[' and ']' (ASCII code \$5B and \$5D), we can either change the application or modify the translation table. Below is shown how the translation table can be modified to accomplish the desired change.

%P	
=54,5	Note 1
=203,\$4D,\$5B,\$5D,\$5D	Note 2
=205=206	Note 3
%	

- Notes:*
1. When the protocol converter is set for 4214 emulation (see the User's Manual), this programming line shall be excluded. In 3812/5219 emulation, it selects the Editable Character Set that unmodified is equal to PC-850.
 2. Function #203 edits the translation table with EBCDIC and ASCII codes in pairs as input data. For example will the EBCDIC character \$4D be translated to ASCII \$5B.
 3. Function #205 saves the change permanently and #206 performs a software reset.
 4. If EBCDIC \$41 (required Space) is programmed with other than ASCII \$20 in 3812/ 5219 emulation, this function is disabled and the programmed character is printed.
 5. Extended Emulation Mode has to be active. See page 33.

Result: The characters '(' and ')' will be printed as '[' and ']'.

Character Substitutions

Up to five different ASCII characters can be replaced with five different ASCII strings.

Note: This is accomplished by programming a value (1-5) in the character translation table instead of the ASCII character that shall be replaced by a string. The new value in the translation table refers to one of the Character Substitution strings in parameter #110 to #114.

Example: The characters '*' and '&' are to be underlined when printed.

%P	
=54,5	Note 2
=110,\$1B,'&d0D*',\$1B,'&d@'	Note 3
=111,\$1B,'&d0D&',\$1B,'&d@'	Note 3
=203,\$5C,1,\$50,2	Note 4
=205=206	Note 5
%	

- Notes:*
1. When the protocol converter is set for 4214 emulation (see the User's Manual), there are 10 Character Substitutions available (parameter #110 to #119).
 2. When the protocol converter is set for 4214 emulation (see the User's Manual), this programming line shall be excluded. In 3812/5219 emulation, it selects the Editable Character Set that unmodified is equal to PC-850.
 3. The parameter is programmed with the start and stop sequence for underline on an HP LaserJet printer with the character to be underlined in between.
 4. The translation table is modified to translate the EBCDIC characters \$5C and \$50 ('*' and '&') to the contents of the strings in parameter #110 to #111 respectively.
 5. Function #205 saves the change permanently and #206 performs a software reset.
 6. Extended Emulation Mode has to be active. See page 33.

Result: The characters '*' and '&' are underlined when printed.

Changing Super/Subscript Level (3812/5219 Emulation Only)

With the protocol converter, it is possible to control the amount of vertical movement for the Superscript and Subscript command issued by the host. Using the default setting will cause text to be moved the distance of half a line feed in the current LPI (Lines per Inch).

Besides the default setting and shutting off the function, the distance can be set to 1/4, 1/6 and 1/8 of a line feed.

Example:

%P	
=51,2	Note 1
=205=206	Note 2
%	

- Notes:
- 1. Parameter #051 is used for Super/Subscript level and 2 selects 1/4 of a line feed.
 - 2. Function #205 saves the change permanently and #206 performs a software reset.
 - 3. Extended Emulation Mode has to be active. See page 33.

Result: Each time the Superscript or Subscript command is issued by the host, the protocol converter will move the current vertical position 1/4 of a line feed upwards (superscript) or downwards (subscript).

Controlling Page Orientation (3812/5219 Emulation Only)

A document can be printed in two different orientations with an additional mode for landscape orientation:

- Portrait Orientation
- Landscape Orientation
- Computer Output Reduction (COR)

There are four different sources of information that determine the orientation and COR:

- Set Text Orientation command (STO)
- Set Physical Page Size command (SPPS) or
- Set Horizontal/Vertical Format command (SHF/SVF)
- Setting of Page Orientation parameter
- Page Presentation Media command (PPM)

Page Orientation with the STO Command

The STO command has the highest priority and the orientation set with this command can never be overridden by any other setting. Besides setting orientation to Portrait, Landscape or COR, the STO command can make a setting called Default. The Default setting means that it's up to the other commands and parameters to determine page orientation.

If the STO command isn't a part of the SCS data stream, determination of page orientation is made as if Default was set.

***Page orientation
without control by
the STO command***

If no STO command is received from the host or if it sets Default, the continued operation is determined by the Page Orientation parameter (parameter #053), which can be set for two overall methods; Automatic Orientation (parameter setting 0,1, 2 and 6) and Non Automatic Orientation (parameter setting 3,4 and 5). The default setting of parameter #053 is for Automatic Orientation.

With the Page Orientation parameter set to Automatic, the orientation is determined by the page size set by the SPPS or SHF/SVF command. A valid page size setting with the depth greater than or equal to the width will cause the orientation to be Portrait. A valid page size setting with the width greater than the depth will cause the orientation to be Landscape.

Note: If orientation is set to be automatic but the page size is invalid, it is the specific setting of parameter #053 that determines the orientation (0: Portrait, 1: Landscape, 2: COR (default setting), 6: COR).

Note: With the Page Orientation parameter set to Non Automatic, it is only the specific setting of parameter #053 that determines the orientation (3: Portrait, 4: Landscape, 5: COR).

If the orientation has been determined to be COR, there is an alternative way for the host to control page orientation, and that is with the PPM command. A setting of the quality byte in the PPM command to 2 or greater will cause the COR setting to be overridden and Portrait be the finally selected orientation. As an extension to an IBM 3816/5219 printer, the protocol converter has a possibility to disable this function by setting parameter #053 to 6.

Note: A valid page size has a width lower than or equal to 8.5 inches and a depth lower than or equal to 14 inches. A valid page size can also have a depth lower than or equal to 8.5 inches and a width lower than or equal to 14 inches.

**Computer Output
Reduction (COR)**

When the algorithm for page orientation determines COR to be activated, it not only switches to Landscape Orientation, but also selects a new font and reduces the line density to 70% of its current value.

Depending on the font in use when COR is determined, a certain predestined font, identified by its FGID number, will be selected. The table below shows which FGID numbers that are used for COR depending on the current font.

Table over FGID mapping for COR:

Current FGID	Current CPI	FGID for COR	CPI for COR
0 - 65	10	204	13.3
66 - 153	12	230	15
154 - 200	Proportional	230	15
201 - 210	13.3	204	13.3
211 - 239	15	281	20
240 - 249	5	204	13.3
250 - 265	17.1	204	13.3
266 - 279	8	204	13.3
280 - 289	20	204	13.3
290 - 297	27	204	13.3
298 -	Typographical	230	15

Reducing Margins (3812/5219 Emulation Only)

It is sometimes desirable to reduce the left and/or top margin. This can especially be the case when pre-printed forms are used and when the text has to be perfectly positioned.

By programming two Offset Text parameters (parameter #055 and parameter #056) it's possible to move text unconditionally upwards and to the left.

The programmed value is measured in units of 1/72 inch, *i.e.* the maximum distance text can be moved is 255/72 inches = 3.5 inches.

If too big a value is issued in any of these parameters, the protocol converter may detect that a requested print position is outside the physical page. In that case the protocol converter will print characters in the first printable position of the page until the requested print position is inside the physical page.

Internal printouts like the Parameter List and EBCDIC-To-ASCII Translation Table are not affected by the Offset Text parameters.

Example:

%P	Note 1
=55,12	Note 2
=56,24	Note 3
=205	
%	

- Notes:*
1. Parameter #055 is used for Text Offset Left.
 2. Parameter #056 is used for Text Offset Up.
 3. Function #205 saves the settings permanently.
 4. Extended Emulation Mode has to be active. See page 33.

Result: All text will be moved 12/72 inch = 1/6 inch to the left and 24/72 inch = 1/3 inch upwards.

Vertical Compression of Text (3812/5219 Emulation Only)

There is a possibility in the protocol converter to compress text vertically. The function is useful for example when an A4 document prints all 70 lines in 6 lpi that theoretically fits into one page and, due to the unprintable area most laser printers have, only 68 lines can be printed. By reducing the distance between each line with only 3%, all 70 lines can be printed one page.

The function is controlled with parameter #057 (Vertical Compress measured in %).

Internal printouts like the Parameter List and EBCDIC-To-ASCII Translation Table are not affected by the Vertical Compression parameters.

Example:

%P	
=57,3	Note 1
=205	Note 2
%	

- Notes:*
1. Parameter #057 is used for vertical compression of text.
 2. Function #205 saves the setting permanently.
 3. Extended Emulation Mode has to be active, page 33.

Result: The distance between each line is reduced by 3%.

Left and Top Margin - COR (3812/5219 Emulation Only)

There is a possibility in the protocol converter to adjust top and left margins when COR is used.

The function is useful for printers that have non-standard default top and left margins in landscape orientation. By setting parameters #58 (Left Margin - COR) and #59 (Top Margin - COR) the top and left margins can be set to get the desired margins.

Internal printouts such as the Parameter List and EBCDIC-To-ASCII Translation Table are not affected by the Left and Top Margin parameters.

Example:

%P	
=58,72	Note 1
=59,72	Note 2
%	

- Notes:*
1. Parameter #058 defines the left margin in units of 1/72 inch. (Default value: 36/72 = 1/2 inch.)
 2. Parameter #059 defines the left margin units of 1/72 inch. (Default value: 36/72 = 1/2 inch.)
 3. Extended Emulation Mode has to be active. See page 33.

Result: The left and top margins are set to 1 inch.

Fonts (3812/5219 Emulation Only)

A font is the appearance of the group of symbols that can be found in a symbol set. The appearance is described by the characteristics: spacing, height, pitch, style, stroke weight and typeface.

In the twinax environment, the font characteristics are summarized in an identification number, FGID (Font Global Identifier) and symbol sets are identified with a Global Code page IDentification number (GCID).

Since a font in an ASCII printer is identified only by its characteristics, the protocol converter uses a predefined font translation list to translate an FGID number to a number of characteristics.

The font translation list is the last 50 parameters of the parameter list, that each contains translation information for one font.

Font Definition in the protocol converter

The necessary information for the protocol converter to make a correct translation from an FGID to an ASCII font selection sequence is stored in parameter #150 to parameter #199. Each parameter is a string of hexadecimal values, a Font Definition String, that contains the translation information needed.

The Font Definition String is put together by four blocks of information; the FGID number (two bytes), the HMI value (one byte), the ASCII character set (one byte) and the ASCII font selection sequence (any number of bytes).

The Font Definition String:

FGID high/low	HMI value	ASCII character set	Font selection sequence
---------------	-----------	---------------------	-------------------------

FGID high/low are two bytes representing the identification number used by the host to select the font.

HMI value is a value measured in units of 1/720 inch that tells the protocol converter which character spacing that should be used for the font. It's important that the contents in this byte is in accordance with the character spacing that is actually being used by the printer since the protocol converter uses this value for internal positioning counters. For the HP LaserJet and Canon Printer Driver, the HMI defined in this byte is automatically set in the printer. For details see page 57.

ASCII character set is a byte that determines which ASCII character set that should be used in the protocol converter and the printer. If set to 0, the character set defined in parameter #054 is used. For details see page 58.

Font selection sequence is the bytes that are actually being sent to the printer for font selection. For details see page 57.

Example:

#158_____	\$00	\$28	\$48	\$00	\$1B	\$28	\$73	\$36	\$54
-----------	------	------	------	------	------	------	------	------	------

(parameter #158 in the HP LaserJet Printer Driver)

Explanation: FGID \$0028 (40) is defined and that is the identification number for the IBM font Gothic Text 10. Accordingly the character spacing 10 cpi is defined in the HMI byte (\$48 = 72 and 720/72 = 10). The font will use the ASCII character set defined in parameter #054 and finally the sequence for selection of typeface Gothic Text in an HP LaserJet printer is defined.

***Predefined FGID
numbers in the
protocol converter***

There are 50 different predefined fonts in the parameter list that are located in parameter #150 to parameter #199. The customer may replace any of these FGID numbers with new definitions.

Predefined fonts in the protocol converter:

Dec.	Hex.	IBM Font Name	Dec.	Hex.	IBM Font Name
3	0003	OCR-B 10	111	006F	Elite Bold
5	0005	Orator 10	112	0070	Prestige Italic 12
11	000B	Courier 10	155	009B	Bold Italic PSM
12	000C	Prestige Pica 10	159	009F	Boldface PSM
18	0012	Courier Italic 10	160	00A0	Essay PSM
19	0013	OCR-A 10	162	00A2	Essay Italic PSM
38	0026	Orator Bold 10	163	00A3	Essay Bold PSM
39	0027	Gothic Bold 10	173	00AD	Essay Light PSM
40	0028	Gothic Text 10	175	00AF	Document PSM
41	0029	Roman Text 10	204	00CC	Gothic Text 13
42	002A	Serif Text 10	230	00E6	Gothic Text 15
43	002B	Serif Text Italic 10	244	00F4	Courier 5
46	002E	Courier Bold 10	245	00F5	Courier Bold 5
60	003C	Prestige Bold 10	252	00FC	Courier 17
66	0042	Gothic Text 12	253	00FD	Courier Bold 17
68	0044	Gothic Italic 12	254	00FE	Courier 17ss
69	0045	Gothic Bold 12	281	0119	Gothic Text 20
70	0046	Serif Text 12	290	0122	Gothic Text 27
71	0047	Serif Text Italic 12	751	02EF	Sonoran Serif 8
72	0048	Serif Bold 12	1051	041B	Sonoran Serif 10
85	0055	Courier 12	1053	041D	Sonoran Serif Bold 10
86	0056	Elite 12	1056	0420	Sonoran Serif Italic 10
87	0057	Letter Gothic 12	1351	0547	Sonoran Serif 12
108	006C	Courier Bold 12	1653	0675	Sonoran Serif Bold 16
110	006E	Letter Gothic Bold	2103	0837	Sonoran Serif Bold 24

Mapping of undefined FGID numbers

Even though 50 different FGID numbers are defined in the parameter list, it may happen that an FGID selected by the host is missing. The protocol converter will in that case go through a mapping table to see if the missing FGID should be replaced with another FGID number.

Below is listed which mappings may take place.

Mapping table for undefined FGID numbers:

Undefined FGID number	Mapped to FGID number	IBM Font Name
13	11	Courier 10
20	12	Prestige Pica 10
26	40	Gothic Text 10
30	11	Courier 10
80	86	Elite 12
91	112	Prestige Italic 12
107	85	Courier 12
158	175	Document PSM
176	159	Boldface PSM
177	155	Bold Italic PSM
221	230	Gothic Text 15
222	230	Gothic Text 15
223	230	Gothic Text 15
225	230	Gothic Text 15
229	230	Gothic Text 15

Note: If any of the FGID numbers in the left column above is defined using parameter programming (see page 36), then no font mapping is performed for that font.

Default Font Selection Sequence

A part of the font selection algorithm is the default font selection sequence. Each sequence contains selection of a complete font including spacing (fixed pitch/proportional), pitch, height, style, stroke weight and typeface.

There is one sequence each in parameter #140 to parameter #149 and their contents are listed below. Selections made by the default font selection sequences in the HP LaserJet Printer Driver:

Param.	Spac.	Pitch	Height	Style	Str. W.	Typeface
#140	fixed	10	12	normal	normal	Courier
#141	fixed	12	10	normal	normal	Prestige
#142	prop.	12	10	normal	normal	Essay/Helvetica
#143	fixed	13.3	10	normal	normal	Gothic-Text
#144	fixed	15	8.5	normal	normal	Gothic-Text
#145	fixed	5	12	normal	normal	Courier
#146	fixed	17.1	8.5	normal	normal	Gothic-Text
#147	fixed	20	8.5	normal	normal	Gothic-Text
#148	fixed	27	6	normal	normal	Gothic-Text
#149	prop.	12	8	normal	normal	Sans-Serif/Times

Font Selection A font selection command from the host makes the protocol converter go through a number of steps before the according font is selected in the printer.

Determine pitch (character spacing) for the requested FGID number.

This is the first step in the font selection algorithm. See the table on page 51 for a list of pitch values and FGID numbers.

Select a default font with the correct pitch in the printer.

Guided by the pitch for the requested FGID number, the protocol converter sends a default font selection sequence that guarantees that a font with the correct pitch is selected in the printer. The default font selection sequences are resident in parameter #140 to parameter #149 in the parameter list.

Search for the requested FGID number in the list of font definition strings (parameter #150 to parameter #199).

The first two bytes of a font definition string in the protocol converter is the FGID number of the font. If the requested font is defined, *i.e.* the FGID number can be found in the parameter list, the information in the following bytes is used for continued font selection.

Determine the Symbol Set to be used.

When the requested FGID number is found among the font definition strings, the fourth byte (ASCII Character Set) is read out and processed. If the byte is set to 0, parameter #054 is used for determination of which character set to use in the protocol converter and the printer. Any other value determines which character set that should be used.

Select Symbol Set in the printer.

One of the selection sequences in parameter #115 to parameter #119 selects the character set that has been defined by parameter #054 or in the font definition string.

Send the additional font selection sequence to the printer.

After the character set selection is made, the font selection sequence defined in the font definition string is sent to the printer. This additional sequence only needs to contain differences from the default font selection sequence. It may also be empty for fonts that are correctly selected with only the default sequence.

Determine the Horizontal Motion Index (HMI) to be set in the printer.

In this step, the third byte of the font definition string is read out and processed. The value in this byte is set in units of 1/720 inch and for fixed pitch fonts it determines the distance between two horizontal print positions. For a proportional font is the width of the space character determined. A setting of 0 in this byte causes the protocol converter to disable word processing functions like justification, boldface printing and word overstrike, and no HMI setting is made in the printer.

Set HMI in the printer.

This is the last step in the font selection algorithm and it makes the HMI setting in the printer according to what was defined in the font definition string.

Note: If the same FGID is defined twice in the parameter list, it is assumed by the protocol converter that the first definition should be used for documents in portrait, and the second one for documents in landscape.

Changing the Horizontal Spacing for a Font

Normally the HMI byte in the font definition string has a value corresponding to the pitch of the defined font, *e.g.* is \$48 defined for all 10 cpi fonts in the parameter list.

It can in some cases be useful to modify the character spacing, for example if a few characters are printed outside the printable area at the right. In such a situation we should slightly increase the character density to make all characters fit within the page.

The character density can be changed by modification of the HMI byte in the font definition sequence. The change is then automatically activated by the HMI setting after the next selection of the font.

Example: (applies only to HP LaserJet compatible Printer Drivers)

We have a user that only gets 78 of 80 characters printed when he uses the font Gothic Text 10 (FGID 40). We therefore want to reduce the distance between each print position for that font with $2/80 * 100\% = 2.5\%$. This means that the HMI value should be reduced by 2.5%. The new HMI value is $72 (\$48) * 0.975 = 70 (\$46)$, which corresponds to a pitch of $720/70 \text{ cpi} = 10.3 \text{ cpi}$.

%P	
=158,\$00,\$28,\$46,\$00,\$1B,\$28,\$73,\$36,\$54	Note 1
=205	Note 2
%	

- Notes:*
1. FGID 40 (\$28) is defined in parameter #158. The definition string is unchanged except for the HMI byte.
 2. Function #205 saves the setting permanently.
 3. Extended Emulation Mode has to be active. See page 33.

Result: The character density is 10.3 cpi for the Gothic Text 10 font and the text width is reduced with 2.5%.

Changing the ASCII Character Set for a Font

Besides the normal case when it is determined by parameter #054, the character set may be defined in the font definition string.

The function can be used, for example, when the user wants to select a font in the printer that cannot be selected with the predefined font selection sequences, and that uses a certain symbol set.

Example: A user with an HP LaserJetIII wants to use the alfa, beta and gamma characters in the Math-8 symbol set when FGID 30 is selected from the host. In the host application he will use 'a' or 'A' to print 'α', 'b' or 'B' for 'β' and 'c' or 'C' for 'γ'. To accomplish this, parameter #155 will be used for font definition and the Editable Set (parameter #119) will be used for selection of Math-8 symbol set.

%P	
=119,\$1B,\$28,\$38,\$4D	Note 1
=155,\$00,\$1E,\$48,\$05	Note 2
=203,\$81,\$61,\$C1,\$61	Note 3
=203,\$82,\$62,\$C2,\$62	
=203,\$83,\$63,\$C3,\$63	
=205=206	Note 4
%	

- Notes:*
1. The parameter for the Editable Set is programmed to select symbol set Math-8.
 2. FGID 30 (\$1E) is defined in parameter #155 to be a 10 cpi font and to use the Editable Set as character set.
 3. The EBCDIC characters 'a' (\$81) and 'A' (\$C1) are edited to be translated to ASCII \$61 (which is the code for the 'α' character in Math-8).
 4. Function #205 saves the changes permanently and #206 performs a software reset.
 5. Extended Emulation Mode has to be active. See page 33.

Result: FGID 30 selects Math-8 in the printer and the Editable Set is used to print 'α', 'β' and 'γ' instead of capital or lower-case 'a', 'b' and 'c'.

Printing with Code Page 259

The host may select different code pages that have different groups of symbols in them. One of these is code page 259 that has mathematical symbols and box drawing characters. Only a few of the characters in code page 259 can be printed with the character sets that are used for normal text.

The protocol converter can handle a code page 259 selection in two different ways.

Using PC-850

At delivery, the protocol converter is set-up to take advantage of as many characters from PC-850 as possible. This will enable printing of the box drawing characters and a few others (page 139).

When the code page 259 selection has been received from the host, the protocol converter will perform a number of steps.

Change EBCDIC-To-ASCII Character Translation Table will be the first thing to happen. This means that the new translation table is adjusted to print as many characters in code page 259 as possible by using the ASCII character set PC-850. The missing characters will be printed as space.

Select PC-850 in the printer is done by sending the contents of parameter #118. If PC-850 is already in use, this step is omitted. Note that printers that don't support PC-850 will not be able to print the correct characters.

When a new code page selection is received, the protocol converter automatically switches back to the character set that was in use before the code page 259 selection was issued, by reversing the steps above.

**Font Selection
Triggered by
Code Page 259**

The protocol converter can be programmed to select a certain font when a code page 259 selection is received from the host.

Depending on the FGID in use when the code page 259 selection comes, one of the FGID numbers 30, 80 and 225 will be used. FGID numbers for 10 cpi fonts are mapped to FGID 30, FGID numbers for 12 cpi fonts are mapped to FGID 80 and FGID numbers for 15 cpi fonts are mapped to FGID 225. If the currently used FGID has another cpi than the ones above, the method described on page 61 is used.

FGID 30, 80 and 225 are not predefined in the parameter list, so to use the font selection method, they have to be defined.

If FGID 30, 80 and 225 are defined, a code page 259 selection will cause the protocol converter to go through the following steps.

Check cpi for the current font to determine which FGID that should be used.

Select the FGID with the correct cpi and follow the procedure described on page 58.

When a new code page selection comes, the protocol converter will automatically switch back to the font and character set that was used before the code page 259 selection came.

*Example (for HP
LaseJetIII
compatible printers):*

A printout uses code page 259 to print the characters '√', 'Δ' and 'Σ' (EBCDIC codes \$4F, \$E6 and \$E2). The solution is to map the code page 259 selection to a selection of one of the fonts with FGID 30, 80 or 225 which should be defined to use the Editable Set. Parameter #119 must be programmed to select Ventura Math symbol set in the printer and the Editable Set has to be programmed to produce the correct ASCII codes for the characters (\$A1, \$44 and \$53).

%P	
=155,\$00,\$1E,\$48,\$05	Note 1
=168,\$00,\$50,\$3C,\$05	Note 2
=190,\$00,\$E1,\$30,\$05	Note 3
=119,\$1B,\$28,\$36,\$4D	Note 4
=203,\$4F,\$A1,\$E6,\$44,\$E2,\$53	Note 5
=205	Note 6
%	

- Notes:*
1. FGID 19 is replaced with FGID 30 that is programmed to print in 10 cpi and with Editable Set.
 2. FGID 71 is replaced with FGID 80 that is programmed to print in 12 cpi and with Editable Set.
 3. FGID 254 is replaced with FGID 225 that is programmed to print in 15 cpi and with Editable Set.
 4. Parameter #119 is used for selection of the character set that should be used for the Editable Set. In this case it is programmed to select Ventura Math in the printer.
 5. Function #203 is used to edit the Editable set according to the task.
 6. Function #205 saves the changes permanently.
 7. Extended Emulation Mode has to be active. See page 33.

Result: The correct characters will be printed if code page 259 is triggered by the host to print the characters ‘√’, ‘Δ’ and ‘Σ’.

String Substitutions

This function is useful when you want to print a document that is prepared for a different PC type printer than yours.

This function is included as standard in the AXIS 330 and the AX-3 Cobra+ (except in 3812/5219 mode where it is optional). Please contact your dealer/distributor for more details.

The document contains control commands for a specific printer, and you have to convert these commands in order to print this document with your printer. Instead of changing the document, you can let the AXIS protocol converter do the conversion for you by using String Substitution.

The String Substitution function will search the data stream for a specified sequence of ASCII characters and substitute them with another sequence. Note that this function operates after the character and control code conversion.

Example: Assume that you have an HP LaserJet. The document is prepared for an IBM Proprinter and contains ‘start underline’ and ‘stop underline’ pass-through commands at several locations. To print the document with an HP LaserJet, the sequences must be converted.

To ‘start underline’, the IBM Proprinter uses ASCII value string \$1B, \$2D, \$31 and the HP LaserJet uses \$1B, \$26, \$64, \$44.

‘Stop underline’ commands are \$1B, \$2D, \$30 and \$1B, \$26, \$64, \$40 respectively.

Below, you will see how to program these substitutions both from a terminal and from the system.

*Programming
String
Substitutions
from a Terminal*

Start the Configuration from Terminal as described in Appendix A, page 143.

Select the Edit Parameters entry in the Main Menu. Match and Substitute Strings start from parameter #150.

Edit the first two string substitution pairs. Use the cursor keys to edit.

The Edit Parameters Menu now looks like this:

```

=====
                        EDIT PARAMETERS
=====
                                     Free String Area: $1AA0

#150 Match String      1_____ $1B,$2D,$31.
#151 Subst. String     1_____ $1B,$26,$64,$44.
#152 Match String      2_____ $1B,$2D,$30.
#153 Subst. String     2_____ $1B,$26,$64,$40.
#154 Match String      3_____ .
#155 Subst. String     3_____ .
#156 Match String      4_____ .
#157 Subst. String     4_____ .
#158 Match String      5_____ .
#159 Subst. String     5_____ .

Use cursor keys to edit, <Enter> to exit

```

When a Match String is encountered in the ASCII data stream, it will be replaced by the subsequent Substitute String.

The maximum Match String length is 50 bytes. The maximum Substitute String length is determined by the Free String Area.

- Notes:*
1. Extensive use of Substitutions may slow down the printing speed.
 2. Changing Printer Driver will delete all String Substitutions.
 3. In 3812/5219 mode string substitution strings start at string #70.

Programming String Substitutions from the System

The same programming example as above can also be obtained by inserting the following lines into your document. String Substitutions are programmed in Extended Emulation Mode.

%P	(Configuration lead-in sequence)
=150,\$1B,\$2D,\$31	(Start underline - Proprinter)
=151,\$1B,\$26,\$64,\$44	(Start underline - HP LaserJet)
=152,\$1B,\$2D,\$30	(Stop underline - Proprinter)
=153,\$1B,\$26,\$64,\$40	(Stop underline -HP LaserJet)
=205	(Initialize settings)
=206	(Save settings permanently)
%	(Configuration trailer sequence)

Bar Codes

This function gives you easy access to a range of standard bar code types resident in the protocol converter. You can design every bar code printout to meet your specific requirements, such as width and height.

This function is included as standard in the AXIS 330 and the AX-3 Cobra+ (except in 3812/5219 mode where it is optional). Please contact your dealer/distributor for more details.

Bar codes are defined and printed by two internal functions:

#211 Define Bar Code

#212 Print Bar Code Data

There are also two parameters controlling the bar code printouts:

#053 Bar Code Driver

#054 Bar Code Attributes

See section 9 and 10 for a description of parameters and functions.

Supported Bar Code Types:

Bar Code Type	Length	Valid Characters	Checksum Digit
1: Code 39	1 - 32	0 - 9, A - Z, Symb.	No
3: UPC-A	11	0 - 9	Yes
8: EAN 8	7	0 - 9	Yes
9: EAN 13	12	0 - 9	Yes
12: 2 of 5 Interl.	1 - 32	0 - 9	No
13: Codabar Matr.	2 - 34	0 - 9, A - D, Symb.	No
*17: Code 128	1 - 32	0 - 9, A - Z, Symb.	No

* Applies to the AX-3 Cobra+ and Axis 330 Cobra only.

- Notes:
1. The symbols supported by Code 39 are plus (+), minus (-), period (.), slash (/), percent (%), dollar (\$), apostrophe (') and space(' ').
 2. The symbols supported by Codabar Matrix are plus (+), minus (-), period (.), slash (/), dollar (\$) and colon (:). A- D can only be used as start and stop characters.

3. Bar codes can only be printed vertically, and only one bar code per line. By using page position commands on laser printers and reverse linefeeds on matrix printers more than one barcode can be printed on the same line.
4. The text below is always printed in 12 cpi, regardless of the current cpi setting.
5. Pages with bar codes should be ended with a form feed to keep correct Top-of-Form.

When using Code 128, unprintable characters and functions can be reached by using ASCII according to the tables below.

Unprintable characters in Code 128 can be reached by using ASCII:

Character	ASCII	Character	ASCII
NUL	\$00	DLE	\$10
SOH	\$01	DC1	\$11
STX	\$02	DC2	\$12
ETX	\$03	DC3	\$13
EOT	\$04	DC4	\$14
ENQ	\$05	NAK	\$15
ACK	\$06	SYN	\$16
BEL	\$07	ETB	\$17
BS	\$08	CAN	\$18
HT	\$09	EM	\$19
LF	\$0A	SUB	\$1A
VT	\$0B	ESC	\$1B
FF	\$0C	FS	\$1C
CR	\$0D	GS	\$1D
SO	\$0E	RS	\$1E
SI	\$0F	US	\$1F
DEL	\$7F		

Function codes in Code 128 can be reached by using ASCII:

Function	ASCII
FNC 1	\$F1
FNC 2	\$FD
FNC 3	\$FC
FNC 4	\$EF

Example:

%P	
=211,1,2,2,1,10	Note 1
=212,"AXIS"	
=211,12,2,2,1,10	Note 2
=212,"1234"	
=211,13,2,2,1,10	Note 3
=212,"A12A"	
=211,3,2,2,1,10	Note 4
=212,"12345678901"	
=211,8,2,2,1,10	Note 5
=212,"1234567"	
=211,9,2,2,1,10	Note 6
=212,"123456789012"	
%	

- Notes:
1. Definition of bar code type Code 39, module width 2/120", height 2/6", human readable text below and start position 10/12" from the left margin.
 2. Definition of bar code type 2 of 5 Interleaved, module width 2/120", height 2/6", human readable text below and start position 10/12" from the left margin.
 3. Definition of bar code type Codabar Matrix, module width 2/120", height 2/6", human readable text below and start position 10/12" from the left margin.
 4. Definition of bar code type UPC-A, module width 2/120", height 2/6", human readable text below and start position 10/12" from the left margin.
 5. Definition of bar code type EAN 8, module width 2/120", height 2/6", human readable text below and start position 10/12" from the left margin.
 6. Definition of bar code type EAN 13, module width 2/120", height 2/6", human readable text below and start position 10/12" from the left margin.
 7. Extended Emulation Mode has to be active. See page 33.

Result:



SECTION 6

PC-HOST SHARING

This section does not apply to the Axis 330 Cobra.

The PC-Host Sharing function makes it possible to share the attached printer between up to three sources; host input, serial PC input, and parallel PC input.

There are six parameters controlling PC-Host Sharing:

- #039 PC-Host Time-out
- #047 Resend Host-PC String
- #058 PC-Host Sequence (4214 Emulation only)
- #060 PC-Host Sequence (3812/5219 Emulation only)
- #059 Host-PC Serial Sequence (4214 Emulation only)
- #061 Host-PC Serial Sequence (3812/5219 Emulation only)
- #064 Host-PC Parallel Sequence
- #065 PC-Host TOF Sequence

The PC-Host Sharing function requires an optional 2-way or 3-way printer cable. For order numbers and configuration procedure, see appendix C and the User's Manual.

Using the PC-Host and Host-PC Sequences

These sequences are used for printer configuration (*e.g.* changing of printer emulation or character set between the two modes).

- The Host-PC Serial Sequence is sent before a serial PC printout. It may contain any printer control commands required by the PC application.
- The Host-PC Parallel Sequence is sent before a parallel PC printout. It may contain any printer control commands required by the PC application.
- The PC-Host Sequence is sent before a host printout if the previous printout was PC serial or parallel. It must restore all printer controls changed by the Host-PC Sequences.
- The PC-Host TOF Sequence is sent before the PC-Host sequence if the PC printout did not end with a Form Feed command (\$0C)
- The Resend Host-PC sequence forces the Host-PC serial or parallel sequences to be sent between two PC printouts if the timer PC-Host Time-out has expired.

Using an External Printer Sharing Device

The AX-3 Cobra+ can also be used with an external printer sharing device. This function is similar to the internal PC-Host Sharing.

The parameters used to control the external printer sharing are:

- #045 Job Time-out. Replaces the PC-Host Time-out.
- #046 Start of Job Sequence. Replaces the PC-Host Sequence.

SECTION 7

SOLVING PROBLEMS

This Section helps you solve common problems that might arise when installing or using your protocol converter. There are three major areas of difficulty:

- Missing printer output
- Incorrect printer output
- Host communication problems

Missing Printout

If the installation has been done correctly and you still don't get printouts as expected, check the following steps for problem determination.

Q: Is the POWER indicator on?

A: No: Your printer can't supply the protocol converter. You must use an external power supply.

Q: Is the attached printer on line (ready)?

A: No: Set the printer on line (see the printer manual).

Q: Is the printer correctly attached?

A: Make sure the protocol converter printer cable is connected to the proper port. If your printer has both parallel and serial input ports, the printer must be set for the printer cable type (parallel/serial) you are using.

Q: For serial attached printers: Are the serial parameters correct?

A: Make sure that the baud rate, stop bits, parity and word length settings match your printer settings. If XON/XOFF protocol is used #039 PC-Host Time-out must be set to 0.

Q: System printouts: Is the SYSTEM indicator on?

A: No: The protocol converter isn't correctly connected to the host, or the power-up routine has been disturbed. (See "Host Communication Problems" on page 73)

A: Flashing: The protocol converter is in Test Mode. To exit set the rotary switch to '9', or switch the protocol converter off and on.

Q: PC printouts: Is the PC-Host Sharing configuration correct?

A: Refer to Section 6 and the User's Manual.

Incorrect Host Printouts

There are three major types of incorrect printout.

Some Characters Are Printed Incorrectly

- **Characters like ä ü Ä Ü are printed as { } []**

Most likely an incorrect System Language has been selected. Select the System Language matching your system configuration.

- **Characters like é ì ô ü are printed as e i o u**

Your printer has not been set up for the character set matching the ASCII Character Set selection in the Printer Driver. Make sure that you have selected the correct Printer Driver.

If this doesn't help, your printer may not be able to print all the characters that the system produces. Print out the EBCDIC-to-ASCII translation table, and compare it to the table in Section 11, page 123. In some cases it is possible to edit the translation table as described in page 44, or to select another character set in your printer.

If you have created your own EBCDIC-to-ASCII translation for IBM 4214 emulation, you might need to modify the power up sequence (parameter #090) to select the correct ASCII table in your printer.

For IBM 3812/5219 emulation you might need to modify parameters #115–#119 to select the correct ASCII table in your printer.

Corrupted Printouts

This is generally caused by selecting a Printer Driver not matching your printer. The control commands will then be misinterpreted by the printer, causing corrupted printouts. If changing the Printer Driver doesn't help, you can use the ASCII hexdump function (see "Producing Hexdumps" on page 74) to locate the control commands causing the problem.

Incorrect Page Breaks (3812/5219 Emulation Only)

This may be caused by a form length setting on the system not corresponding to the physical form length in the printer. It could also be caused by the printer that in most cases cannot print on the whole page (a few lines may be lost at the end of a page). In case of the latter, the protocol converter can automatically vertically compress the page, see "Vertical Compression of Text (3812/5219 Emulation Only)" on page 53.

***Incorrect Page
Breaks (4214
Emulation Only)***

If the form length is correctly set on the host, the most likely cause is that an incorrect Printer Driver has been selected (*e.g.* Epson FX/EX/DFX instead of Epson LQ)

If the attached printer can emulate IBM Proprinter or Epson FX type printers, it is recommended that either one of these emulations is used.

***Host
Communication
Problems***

If the protocol converter has been connected to a host system with the Axis T-cable and a printout has been unsuccessfully sent to the unit, please see the following steps for problem determination.

Q: Is the SYSTEM indicator lit?

A: The printer may be not properly connected. Please refer to the User's manual.

Q: Is the device address correct?

A: Make sure the rotary switch is set to the desired device address. Switch the protocol converter off and then on again. Permissible values for the device address are within the range 0 to 6.

Q: Does the host configuration match the protocol converter configuration?

A: The protocol converter must be configured according to the IBM printer that has been defined for the device address on the twinax port.

Q: Has the print job been released from the host?

A: Check that Vary ON has been made and that the print job has been released from the print queue. Ask your system manager.

Q: Is the twinax line terminated?

A: The last unit on the twinax line must be terminated. Check that all units along the twinax line are installed correctly and that the termination is correct.

Q: Are any cables broken?

A: Check that the cables are properly connected and fully functional.

Reporting Problems

If you have an unsolved problem, you should contact your dealer/distributor for further instructions. The dealer/distributor may ask you to make an error report which should include:

- A printout with a description of the errors.
- If possible, a correct printout.
- A Parameter List.
- A System hexdump.
- An ASCII hexdump.

Data sent to the protocol converter can also be recorded and analyzed with the Axis Emma System, see page 75.

You may also send questions and reports using Email to:

“info@axis.com” (Sweden), “info@axisinc.com” (USA), “info@axiscom.co.jp” (Japan) or “info@axis.com.hk” (Hong Kong and Asia). See Appendix F page 163 for more details.

Printing the Parameter List

The Parameter List shows the complete configuration. A selection of parameters are described in Appendix A. To print the Parameter List, do as follows:

Switch the protocol converter and printer off and on.

Make sure the printer is on line.

Set the rotary switch to ‘9’.

Wait for approximately 3 seconds until the SYSTEM indicator starts to flash.

Set the rotary switch to ‘8’.

The Parameter List will now be printed. Wait until the printout is completed.

Set the rotary switch to ‘9’ when the printout is completed.

The SYSTEM indicator will stop flashing.

Select the desired device address to resume normal print operation.

Producing Hexdumps

A hexdump is a printout where the input data stream is printed as hexadecimal byte values rather than being interpreted as characters and control codes. The protocol converter features two different types of hexdump modes:

- **System hexdump**

This mode will trap the input SCS data before the character and control code conversion. The data is printed as EBCDIC hexadecimal values.

- **ASCII hexdump**

The input data is converted to ASCII hexadecimal values before printing. This mode is useful if you want to see what printer control command a certain IBM control code corresponds to.

To produce a hexdump, do as follows:

Switch the protocol converter and printer off and on.

Set the rotary switch to '9'.

Wait for approx 3 seconds until the SYSTEM indicator starts to flash.

Set the rotary switch to '4' for system hexdump or '3' for ASCII hexdump.

Send the print job you want to analyze.

The data will now be printed in hexadecimal form.

Set the rotary switch to '9'.

The SYSTEM indicator stops flashing.

Select device address and restart the protocol converter.

The Emma System

If your dealer/distributor has an Axis Emma system, you can record data sent between the host and the protocol converter and send it for analysis. Contact your dealer/distributor for more information.

Error Messages

There are six different error conditions that causes the protocol converter to print an error message on your printer.

61 - UNPRINTABLE CHARACTER

This message is caused by invalid character codes or LAC buffer overflow.

64 - RESET COMMAND RECEIVED FROM HOST

This message is caused by bad communication lines or colliding device addresses. The protocol converter will try to re-establish communication after 10 seconds.

BE - BAR CODE ERROR

This message indicates that an incorrect or insufficient bar code definition has been used. See Section 5, page 63 and Section 10, page 116 for syntax and examples.

E2 - PERMANENT MEMORY CHECKSUM ERROR, FACTORY DEFAULTS SET
--

This message indicates that the non-volatile memory has been corrupted. The protocol converter is automatically set to factory default state (your configuration is lost). This is a normal consequence of a change between IBM 3812/5219 and IBM 4214 emulation. If the message does not appear after power-off/power-on, configure the protocol converter. (See user's manual).

E6 - FREE STRING AREA EXHAUSTED

The available string area is exhausted. You must remove some strings from your configuration (User Definable Strings or String parameters in the Parameter List). The size of the available string area is printed in the Parameter List header, and is also displayed in all string programming menus.

F1 - TWINAX TRANSCEIVER ERROR

Hardware error. Contact your dealer/distributor.

SECTION 8

PRINTER DRIVERS

A Printer Driver is a device driver containing all the parameters, including command sequences and character sets, required to drive a particular range of printers.

Printer Drivers (3812/5219 Emulation Only)

Available Printer Drivers in 3812/5219 emulation AX-3 Cobra+ and AXIS 330 Cobra:

Value	Description
*70	HP LaserJet II/III
71	Kyocera
72	Canon LBP-8III
73	IBM Laser (PPDS)
74	HP LaserJet 4

Printer Drivers (4214 Emulation Only)

Available Printer Drivers in 4214 emulation AX-3 Cobra+:

Value	Description
*30	Generic Printer
31	IBM Graphics
32	IBM Proprinter
33	Epson FX/EX/DFX
34	Epson LQ
35	Fujitsu DL (DPL24C)
36	Fujitsu DX (Epson FX)
37	OKI 320 (Epson FX)
38	OKI 390 (Epson LQ)
39	OKI 393 (Epson LQ)
40	OKI 2350/2410
41	Diablo 630
42	Philips GP300
43	Mannesmann MT660
44	IBM Matrix (PPDS)
47	Brother M-4018
48	HP LaserJet
50	Canon LBP8-III
51	IBM Laser (PPDS)
52	Xerox 3700/4045

Available Printer Drivers in 4214 emulation AXIS 330 Cobra:

Value	Description
*30	Generic Printer
31	IBM Graphics
32	IBM Proprinter
33	Epson FX/EX/DFX
34	Epson LQ
35	Fujitsu DL (DPL24C)
44	IBM Matrix (PPDS)
48	HP LaserJet

**Printer Drivers
(AX-4039 Only)**

A printer driver is a device driver containing all the parameters required to drive a particular range of drivers. The following printer drivers are available in IBM 3812/5219.

Value	Description
*70	HP PCL (<i>default</i>)

The following printer drivers are available in IBM 4214 emulation:

Value	Description
*30	HP PCL (<i>default</i>)

**Printer Drivers
(AXIS OKI-HD)**

A printer driver is a device driver containing all the parameters required to driver a particular range of printers. The following printer drivers are available in 4214 emulation

Value	Description
*30	OKI/OKIDATA 393/395 Epson LQ (<i>default</i>)
31	OKI/OKIDATA 3410 Epson FX
32	OKI 393/395 Proprinter
33	OKIDATA 393 Proprinter
34	OKIDATA 395 Proprinter
35	OKI/OKIDATA 3410 Proprinter
36	Generic Printer

SECTION 9

THE PARAMETER LIST

This Section describes the parameters available in the protocol converter. All parameters can be edited using either the Configuration from the System (see “Configuration from the System” on page 36) or from the Edit Parameters entry in the main menu of the Configuration from a Terminal (see the User’s Manual).

“Parameters (3812/5219 Emulation Only)” below, covers the parameters available in 3812/5219 emulation mode and “Parameters (4214 Emulation Only)” on page 96, the parameters available in 4214 emulation mode.

Parameters (3812/5219 Emulation Only)

#010 System Language

Makes the EBCDIC Language Coded-To-EBCDIC International Set 5 Character Translation Table match the system language configuration of the IBM system.

Value	Code Page	Description
1	037	US English/Canadian
2	273	German/Austrian
3	274	Belgian
4	275	Brazilian
5	276	Canadian French
6	277	Danish/Norwegian
7	278	Finnish/Swedish
8	297	French
*9	500	International Set 5
10	280	Italian
11	281	Japanese English
12	282	Portuguese
13	284	Spanish Speaking
14	285	UK English
15	871	Icelandic

#028 Time Before Off-Line

The value in this parameter is counted in 1/10 of a second and controls the off-line (Unit Not Available) information to the host if the printer goes off-line during printing. It determines the time from when the protocol converter detects the off-line or paper out state of the printer, until it responds information about it to the host.

Value	Description
0	The protocol converter never responds Unit Not Available to the host
1-255	Delay in 1/10 of a sec. between printer off-line and Unit Not Available
*200	Factory default

#031 Baud Rate

Does not apply to the Axis 330 Cobra.

Controls the serial port baud rate.

Value	Description
1	100 baud
3	300 baud
6	600 baud
12	1200 baud
18	1800 baud
24	2400 baud
36	3600 baud
48	4800 baud
72	7200 baud
*96	9600 baud
192	19200 baud

Note: 1. The value 192 (19200 baud) cannot be used with PC-Host Sharing.

#032 Word Size

Does not apply to the Axis 330 Cobra.

Serial port word size (number of bits).

Value	Description
7	7 bits
*8	8 bits

#033 Parity

Does not apply to the Axis 330 Cobra.

Serial port parity.

Value	Description
*0	No parity
1	Odd parity
2	Even parity

#034 Stop Bits

Does not apply to the Axis 330 Cobra.

Number of stop bits for the serial communication.

Value	Description
1	One stop bit
*2	Two stop bits

#035 XON/XOFF

Does not apply to the Axis 330 Cobra.

Handshake protocol for serial communication.

Value	Description
Yes	XON/XOFF protocol
*No	Ready/Busy protocol

- Note:* 1. If a serial cable is used from the protocol converter to the printer and XON/XOFF is set to Yes, #039 PC-Host Time-out must be set to 0.

#036 XON Character

Does not apply to the Axis 330 Cobra.

XON character for serial communication.

Value	Description
\$00 - \$FF	XON character
\$11	Factory default

#037 XOFF Character

Does not apply to the Axis 330 Cobra.

Value	Description
\$00 - \$FF	XOFF character
\$13	Factory default

#038 Inverted Busy

Does not apply to the Axis 330 Cobra.

Serial interface DTR (Ready/Busy) signal polarity.

Value	Description
Yes	DTR is low when printer is busy
*No	DTR is high when the printer is busy

#039 PC-Host Time-out

Does not apply to the Axis 330 Cobra.

Timer value controlling the automatic switching between PC and host input.

Value	Description
0 - 255	Valid range
0	Host input only
*10	10 seconds delay
254	254 seconds delay (maximum)
255	PC serial input only

- Note:* 1. When an input gains control, the other inputs will be held busy until the PC-Host Time-out has expired.

Related parameters: #047 Resend PC-Host String #064 Host-PC Par. String
 #060 PC-Host String #065 PC-Host TOF String
 #061 Host-PC Ser. String

#040 Escape Character

The EBCDIC International Set 5 character code for Single-Byte Transparency and User Definable Strings.

Value	Description
\$40 - \$FF	Escape Character (EBCDIC character code)
\$00	Factory default (Escape Character disabled)

- Notes:*
1. The parameter value must be entered as an EBCDIC character code.
 2. The Escape Character is automatically set when the Extended Emulation Control Sequence is received.
 3. For use with the FormsXpress program the escape character should be set to \$BA ('¬'). The sequences '¬R', '¬I', and '¬S' will then have special meanings to the extended emulation handler. See also "FormsXpress Transparency" on page 41.

Related parameter: #044 Extended Emulation Control Sequence

#041 Transparency Lead-In Sequence

The sequence bypasses the normal emulation and starts a Multi-Byte Transparency session.

Value	Description
<TLI>	Multi-Byte Transparency start sequence
<empty>	Factory default (Multi-Byte Transparency disabled)

- Notes:*
1. The Transparency Lead-In Sequence will be automatically set when the Extended Emulation Control Sequence is received.
 2. The sequence must be entered in EBCDIC character codes or literals (*e.g.* <\$6C,\$6C> or </%%/> sets the Transparency Lead-In Sequence to '%%').
 3. Maximum 8 characters may be used as Transparency Lead-In Sequence
 4. For use of Prescribe sequences on Kyocera printers, a special transparency mode is available. This mode is selected by setting the Transparency Lead-In Sequence to \$4F, \$D9, \$4F ('!R!'). See also "Prescribe Transparency" on page 41.
 5. For use with the FormsXpress program the Transparency Lead-In Sequence should be set to \$BA \$BA ('¬¬'). See also "FormsXpress Transparency" on page 41.

Related parameters: #043 Transparency/Configuration Trailer Sequence
 #044 Extended Emulation Control Sequence

#042 Configuration Lead-In Sequence

The sequence bypasses the normal emulation and starts a Configuration from the System session.

Value	Description
<CLI>	Configuration start sequence
<empty>	Factory default (Configuration from the System disabled)

- Notes:*
1. The Configuration Lead-In Sequence will be automatically set when the Extended Emulation Control Sequence is received.
 2. The sequence must be entered in EBCDIC character codes or literals (e.g. <\$6C,\$D7> or </%P/> sets the Configuration Lead-In Sequence to '%P').
 3. Maximum 8 characters may be used as Configuration Lead-In Sequence.

Related parameters: #043 Transparency/Configuration Trailer Sequence
#044 Extended Emulation Control Sequence

#043 Transparency/Configuration Trailer Sequence

The sequence ends a Multi-Byte Transparency or Configuration from the System session and resumes normal emulation mode.

Value	Description
<TCT>	Transparency/Configuration stop sequence
<empty>	Factory default

- Notes:*
1. The Transparency/Configuration Trailer Sequence will be automatically set when the Extended Emulation Control Sequence is received.
 2. This sequence must be entered in EBCDIC character codes or literals (e.g. <\$6C> or </%/> sets the Transparency/Configuration Trailer Sequence to '%').
 3. Maximum 8 characters may be used as Transparency/Configuration Trailer Sequence.
 4. Changing the trailer sequence will take immediate effect, i.e. the current configuration session must be terminated with the new trailer sequence.
 5. The Trailer Sequence must not be made empty since Multi-Byte Transparency or Configuration from the System cannot be correctly terminated in that case.

Related parameters: #041 Transparency Lead-In Seq. #044 Extended Emulation Control Seq.
#042 Configuration Lead-In Seq.

#044 Extended Emulation Control Sequence

The sequence starts and stops Extended Emulation Mode.

Value	Description
<EECS>	Extended Emulation Control Sequence
\$50 \$50 \$6F \$6F	Factory default ('&&??')

- Notes:*
1. The Extended Emulation Control Sequence must be entered in EBCDIC character codes or literals (*e.g.* <\$50,\$50,\$6F,\$6F> corresponds to the character sequence ('&&??')).
 2. The sequence must be followed by three EBCDIC character codes (*e.g.* '&&??%P' will start Extended Emulation Mode and '&&??000' will end Extended Emulation Mode).
 3. Maximum 8 characters may be used as Transparency Lead-In Sequence.

Related parameters:

#040 Escape Character	#042 Configuration Lead-In Seq.
#041 Transparency Lead-In Seq.	#043 Transparency/Config. Trailer Seq.

#045 Job Time-out

Timer value starting after a host job has ended. If the Time-out value is reached before any new data has come to the Cobra+, the Start of Job Sequence (#046), Power-Up Sequence (#090) and current emulator settings will be sent before next job.

Value	Description
0	off (default)
1-255	Time in seconds

Related parameter:

#046 Start of Job Sequence

#046 Start of Job Sequence

The Start of Job Sequence is sent to the printer before next host printout if timer Job Time-out has elapsed.

Value	Description
<any seq.>	Start of Job Sequence
<empty>	Factory default

Related parameter:

#045 Job Time-out

#047 Resend PC-Host String

Does not apply to the Axis 330 Cobra.

Host-PC Serial String (#061) or Host-PC Parallel String (#065) are sent if new data is recieved from the PC and PC-Host Time-out (#039) has expired.

Value	Description
*No	The strings are not sent. <i>(default)</i>
Yes	Resend strings

*Related
parameters:*

#039 PC-Host Time-out

#064 PC-Host Parallel String

#060 PC-Host String

#065 Host-PC Parallel String

#061 Host-PC Ser. String

#049 Bar Code Driver

Applies to the Axis 330 Cobra only.

Selects the graphic driver used for bar code printing. The default value depends on the selected Printer Driver. This parameter is only valid in IBM 3812/5219 emulation.

Value	Description	Value	Description
0	Off	2	Epson LQ/Fujitsu DPC24C
1	IBM Proprinter/Epson FX	8	HP-PCL

#050 Bar Code Attributes

Applies to the Axis 330 Cobra only.

Adjust bar code printout quality to paper and print conditions. This parameter is only valid in IBM 3812/5219 emulation.

Value	Description	Value	Description
*0	Normal (default)	2	Bold
1	Thin	3	Thin and Bold

#051 Super/Subscript Level

The parameter controls the distance text is moved upwards or downwards when the Superscript or Subscript command is received from the host.

Value	Description
0	No Super/Subscript will be performed (Super/Subscript disabled)
*1	Text will be moved 1/2 of a line feed (forward or backward)
2	Text will be moved 1/4 of a line feed (forward or backward)
3	Text will be moved 1/6 of a line feed (forward or backward)
4	Text will be moved 1/8 of a line feed (forward or backward)

#052 Font Setting Mode

For determination of when a font selection, initiated from the host, shall cause the protocol converter to select a font in the printer.

Value	Description
0	No font selection will be made (font selection disabled)
*1	A font will be selected if it differs from the previous one selected
2	Always select a font

#053 Page Orientation Mode

The parameter determines how to handle page orientation.

Value	Description
0	Automatic Orientation - Portrait if invalid page size set from host
1	Automatic Orientation - Landscape if invalid page size set from host
*2	Automatic Orientation - COR if invalid page size set from host
3	Always Portrait
4	Always Landscape
5	Always COR
6	Same as 2, but inhibit COR from host will be ignored

#054 ASCII Character Set

For selection of the character set that will be used in the protocol converter and an attached printer.

Value	Description
1	US ASCII
2	PC-437 (PC-8, IBM PC Set 2, Code Page 437)
3	Roman-8
4	PC-850 (Code Page 850)
5	Editable Set

- Notes:*
1. The default value depends on the selected Printer Driver.
 2. The corresponding character set is automatically selected in the printer when this parameter is changed.
 3. Character Editing is always performed in the Editable Set and changes in the character translation table doesn't take effect until this character set is selected.
 4. Unchanged, the Editable Set is equal to the PC-850 character set.

Related parameters:

#115 Character Set 1 - US ASCII

#118 Character Set 4 - PC-850

#116 Character Set 2 - PC-8

#119 Editable Character Set

#117 Character Set 3 - Roman-8

#055 Offset Text Left (set in 1/72th of an inch)

The parameter can be used to move text unconditionally to the left.

Value	Description
*0	Text will not be moved to the left (offset text left disabled)
1 - 255	Text will be moved (minimum 1/72" and maximum 255/72" = 3.5")

- Notes:*
1. This parameter has no effect on internal printouts like the Parameter List and EBCDIC-To-ASCII Translation Table.
 2. All text moved outside the physical page will be printed in the first printable position.

#056 Offset Text Up (set in 1/72th of an inch)

The parameter can be used to move text unconditionally upwards.

Value	Description
*0	Text will not be moved upwards (offset text up disabled)
1 - 255	Text will be moved (minimum 1/72" and maximum 255/72" = 3.5")

- Notes:*
1. This parameter has no effect on internal printouts like the Parameter List and EBCDIC-To-ASCII Translation Table.
 2. All text moved outside the physical page will be printed in the first printable position.

#057 Vertical Compress %

For vertical compression of text. The function is useful when lines are lost at the bottom of a page.

Value	Description
*0	No compression will be made (vertical compress disabled)
1 - 99	Text will be compressed (minimum 1% and maximum 99%)

- Note:*
1. This parameter has no effect on internal printouts like the Parameter List and EBCDIC-To-ASCII Translation Table.

#58 Left Margin- COR n/72 inch

This string sets the left margin for COR printouts.

Value	Description	Value	Description
1-255	Valid range	*36	1/2" (default)

#59 Top Margin- COR n/72 inch

This string sets the top margin for COR printouts.

Value	Description	Value	Description
1-255	Valid range	*36	1/2" (default)

#060 PC-Host String

Does not apply to the Axis 330 Cobra

The contents of this string will be sent to the printer each time the PC-Host Sharing function switches from PC input to host input.

Value	Description
<any seq>	ASCII data sequence to be sent
<empty>	Factory default (PC-Host String disabled)

Related parameters:

#039 PC-Host Time-out

#064 Host-PC Par. String

#047 Resend PC-Host String

#065 PC-Host TOF String

#061 Host-PC Ser. String

#061 Host-PC Serial String

Does not apply to the Axis 330 Cobra

The contents of this string will be sent to the printer each time the PC-Host Sharing function switches from host input to PC serial input.

Value	Description
<any seq>	ASCII data sequence to be sent
<empty>	Factory default (Host-PC Ser. String disabled)

Related parameters:

#039 PC-Host Time-out

#064 Host-PC Par. String

#047 Resend PC-Host String

#065 PC-Host TOF String

#060 PC-Host String

#062 Form Feed

The contents of this string is sent to the printer each time a form feed is received from the host.

Value	Description
<any seq>	ASCII data sequence to be sent
\$0C	Factory default (form feed control character)

#063 Header String

The contents of this string is printed on the second line of the Parameter List.

Value	Description
<any seq>	Header Text
<empty>	Factory default (no text printed)

Note: 1. Use this parameter to add your own information to the parameter list header.

#064 Host-PC Parallel String

Does not apply to the Axis 330 Cobra

The contents of this string will be sent to the printer each time the PC-Host Sharing function switches from host input to PC parallel input.

Value	Description
<any seq>	ASCII data sequence to be sent
<empty>	Factory default (Host-PC Par. String disabled)

Related parameters:

#039 PC-Host Time-out	#061 Host-PC Ser. String
#047 Resend PC-Host String	#065 PC-Host TOF String
#060 PC-Host String	

#065 PC-Host TOF String

Does not apply to the Axis 330 Cobra

This string is sent before the PC-Host String (parameter #060) if the PC printout did not end with a Form Feed command (\$0C).

Value	Description
<any seq>	PC-Host TOF String
\$0C	Factory default

Note: 1. If your PC-printout ends with an other command (*e.g.* Printer Reset), you can empty this sequence to avoid empty forms between PC and host printouts.

Related parameters:

#039 PC-Host Time-out	#061 Host-PC Ser. String
#047 Resend PC-Host String	#065 PC-Host TOF String

#070-#089 String Substitutions

Programming and use are described in “String Substitutions” on page 63.

Applies to AXIS 330 Cobra only.

Value	Description
<any seq>	Any length and content
<empty>	Factory default

#090 Power-Up Sequence

The Power-Up sequence is sent to the printer when the protocol converter is powered on.

Value	Description
<any seq>	ASCII data sequence to be sent at power on
<empty>	No sequence sent at power on (Power-Up Sequence disabled)

- Notes:*
1. The default sequence depends on the selected Printer Driver.
 2. The Power-Up Sequence is primarily intended for setting of printer parameters like emulation and margins, but may also be used for downloading of fonts and logos.
 3. The Power-Up Sequence is sent before the warm start sequences.

#095 Sheet Feeder 1**#096 Sheet Feeder 2****#097 Sheet Feeder 3 (Envelope)****#098 Sheet Feeder 4****#099 Single Sheet**

These parameters are used for selection of paper source in the printer.

Value	Description
<any seq>	ASCII data sequence for selection of paper source
<empty>	No selection sequence will be sent (sheet feeder selection disabled)

- Note:*
1. The default sequences depend on the selected Printer Driver.

#100 Simplex**#101 Duplex Normal****#102 Duplex Tumble**

These parameters control duplex printing and selects one of the three modes in the printer on request from the host.

Value	Description
<any seq>	ASCII data sequence for selection of simplex/duplex
<empty>	No selection sequence will be sent (simplex/duplex disabled)

#103 Portrait**#104 Landscape**

Parameters for control of print orientation.

Value	Description
<any seq>	ASCII data sequence for selection of portrait/landscape
<empty>	No selection sequence will be sent (portrait/landscape disabled)

#110 Character Substitute 1**#111 Character Substitute 2****#112 Character Substitute 3****#113 Character Substitute 4****#114 Character Substitute 5**

Each of these parameters can contain a string that may replace an ASCII character.

Value	Description
<any seq>	ASCII data sequence replacing an ASCII character
<empty>	Factory default

- Note:* 1. To use a substitute sequence, a character in the Editable Set must have been programmed to a value in the range \$01 - \$05. At translation from EBCDIC to ASCII, that value will refer to one of the character substitute sequences that will replace the original ASCII character.

Related parameter: #054 ASCII Character Set

#115 Character Set 1 - US ASCII**#116 Character Set 2 - PC-8****#117 Character Set 3 - Roman-8****#118 Character Set 4 - PC-850****#119 Editable Character Set**

Sequences used for selection of character set in the printer.

Value	Description
<any seq>	ASCII data sequence selecting character set
<empty>	No character set will be selected

- Notes:* 1. The default sequences depend on the selected Printer Driver.
2. The setting of Parameter #054 determines which of the sequences that will be used (unless the font definition string overrides that setting).

Related parameters: #054 ASCII Character Set
#150 - #199 Font Definition Sequences

#120 User Definable String 0**#121 User Definable String 1****#122 User Definable String 2****#123 User Definable String 3****#124 User Definable String 4****#125 User Definable String 5****#126 User Definable String 6****#127 User Definable String 7****#128 User Definable String 8****#129 User Definable String 9**

These strings are reserved for customer use and may be programmed to contain arbitrary data.

Value	Description
<any seq>	ASCII data sequence
<empty>	Factory default

- Note:* 1. The contents of the User Definable Strings can be sent to the printer using a special syntax, see “User Definable Strings” on page 42.

#130 Underline On**#131 Underline Off**

Two parameters used for control of underlining initiated by the host.

Value	Description
<any seq>	ASCII data sequence for start/stop of underline
<empty>	No underlining performed (underline function disabled)

- Note:* 1. The default sequences depend on the selected Printer Driver.

#132 Job Offset (Jogging)

Parameter used for jogging of the printer’s output tray between jobs.

Value	Description
<any seq>	ASCII data sequence for output tray jogging
<empty>	No jogging performed (jogging function disabled)

#133 Horizontal Motion Index

Sets in the printer the horizontal distance the print position will advance for each printed character (*i.e.* the character width).

Value	Description
<any seq>	ASCII data sequence for setting of character width
<empty>	No character width will be set (horizontal motion index disabled)

- Notes:*
1. The default sequence depends on the selected Printer Driver.
 2. The HMI will be set after each font selection sequence sent to the printer.
 3. The HMI value is determined by the third byte in the font definition string of the currently selected font.
 4. For a proportionally spaced font, the HMI sets the width of the space character.

Related parameters: #150 - #199 Font Definition Sequences

#134 Horizontal Position

#135 Vertical Position

The strings in these parameters are used for setting of absolute horizontal and vertical print position with a resolution of 1/720".

Value	Description
<any seq>	ASCII data sequence for setting of horizontal/vertical print position
<empty>	No print position will be set

- Notes:*
1. The default sequences depend on the selected Printer Driver.
 2. These parameters must always have appropriate contents to make the protocol converter print host printouts correctly.

#136 Offset for Bold

#137 Reset Offset for Bold

Simulated boldface printing is performed by printing text twice with a small displacement the second time. These strings are used to do the displacement and to reset to normal printing.

Value	Description
<any seq>	Performs a small relative positioning forwards/backwards
<empty>	No boldface performed (simulated boldface printing disabled)

#140 Default Font 10 CPI**#141 Default Font 12 CPI****#142 Default Font Proportional (PSM)****#143 Default Font 13.3 CPI****#144 Default Font 15 CPI****#145 Default Font 5 CPI****#146 Default Font 17.1 CPI****#147 Default Font 20 CPI****#148 Default Font 27 CPI****#149 Default Font Typographic**

When a font selection command is received from the host, the protocol converter checks the character spacing for the selected font. The first thing that is sent to do the font selection in the printer is the appropriate Default Font Selection Sequence.

Value	Description
<any seq>	A default font with the correct CPI will be selected
<empty>	No default font will be selected

Note: 1. The default sequences depend on the selected Printer Driver.

Related parameters: #052 Font Setting Mode
#150 - #199 Font Definition Sequences

#150-199 Font Definition and Selection Sequences

When a font selection command has been received from the host and the protocol converter has sent the appropriate Default Font Selection Sequence to a printer, the contents of these parameters will be used to complete the font selection.

Each sequence consists of two parts; one for definition of FGID, HMI and ASCII Character Set, and one for the sequence that will be sent to the printer for font selection.

The two first bytes define the FGID number of the font. The third byte determines the character spacing (HMI) and the fourth byte connects one of the ASCII Character Sets in parameter #115 - #119 to the font defined in the current sequence (a value of 0 in this byte means that the ASCII Character Set defined in parameter #054 will be used).

The sequence following the fourth byte will unconditionally be sent to the printer as an addition to the Default Font Selection Sequence.

After the additional sequence has been sent, the character spacing defined in the third byte (HMI) will be set in the printer (see parameter #133).

Value	Description
<any seq>	A font is defined with possible selection sequence
<empty>	No font is defined and no selection will be made

Parameters (4214 Emulation Only)

#001 Form Length

The value in this parameter is set in the printer at power up and software reset, and when the Set Horizontal Format command selects the front panel setting.

Value	Description
0-255	Form Length in number of lines
*48	Factory default

Note: 1. The Form Length setting is overridden by the Set Horizontal Format command.

Related parameters: #029 Lock Form Length #071 Form Length Format
#070 Form Length Header #072 Form Length Tail

#002 Character Density

Designates the character density to set in the printer at power up.

Value	Description
5	5 characters per inch
*10	10 characters per inch
12	12 characters per inch
15	15 characters per inch
16	16.7 characters per inch

Note: 1. The Character Density parameter is overridden by the Set Character Density command.

Related parameters: #006 Lock Characters per Inch #087 12 cpi selection sequence
#085 5 cpi selection sequence #088 15 cpi selection sequence
#086 10 cpi selection sequence #089 16.7 cpi selection sequence

#003 Line Density

The parameter setting determines the line density that will be set at power up. The value is rounded to a multiple of 1/72 inch.

Value	Description
0-255	Line density in Lines per Inch
*6	Factory Default

Note: 1. The Line Density parameter is overridden by the Set Line Density command.

Related parameters: #007 Lock Lines per Inch #082 Line Density Tail
#080 Line Density Header #083 6 Lines per Inch
#081 Line Density Format #084 8 Lines per Inch

#004 Feeder Type

Designates the paper feeder type to be selected at power up.

Value	Description
*0	Continuous Form (Tractor Feed)
1	Sheet Feeder 1
2	Sheet Feeder 2
3	Sheet Feeder 3
4	Single Sheet

Note: 1. The Feeder Type parameter is overridden by the Page Presentation Media command.

Related parameters: #008 Lock Feeder Type #097 Sheet Feeder 2 selection seq.
 #095 Continuous Form selection seq. #098 Sheet Feeder 3 selection seq.
 #096 Sheet Feeder 1 selection seq. #099 Single Sheet selection seq.

#005 Print Quality

The Print Quality set in this parameter is set in the printer at power up.

Value	Description
*1	Quality 1 (Draft Quality)
2	Quality 2 (Near Letter Quality)
3	Quality 3 (Fast Draft)
4	Quality 4

Note: 1. The Print Quality parameter is overridden by the Page Presentation Media command.

Related parameters: #009 Lock Print Quality #077 Quality 3 selection seq.
 #075 Quality 1 (Draft Quality) selection seq. #078 Quality 4 selection seq.
 #076 Quality 2 (Near Letter Quality) selection seq.

#006 Lock CPI

If set to Yes, the cpi defined in parameter #002 cannot be overridden by the Set Character Density command.

Value	Description
*no	Allow the Set Character Density command to set cpi
yes	The Set Character Density command is disabled

Related parameter: #002 Character Density

#007 Lock LPI

If set to Yes, the lpi defined in parameter #003 cannot be overridden by the Set Line Density command.

Value	Description
*no	Allow the Set Line Density command to set lpi
yes	The Set Line Density command is disabled

Related parameter: #003 Line Density

#008 Lock Feeder Type

If set to Yes, the Feeder Type defined in parameter #004 cannot be overridden by the Page Presentation Media command.

Value	Description
*no	Allow the Page Presentation Media command to select Feeder Type
yes	Feeder Type selection from the host is ignored

Related parameter: #004 Feeder Type

#009 Lock Print Quality

If set to Yes, the Print Quality defined in parameter #005 cannot be overridden by the Page Presentation Media command.

Value	Description
*no	Allow the Page Presentation Media command to select Print Quality
yes	Print Quality selection from the host is ignored

Related parameter: #005 Print Quality

#010 System Language

See “Parameters (3812/5219 Emulation Only)” on page 79.

#011 Maximum Print Position

The setting in this parameter is used as the default value for maximum print position. It is used at power up and when the Set Horizontal Format command selects the front panel setting. The maximum print position is automatically adjusted by the protocol converter not to be greater than allowed by the value defined in parameter #019.

Value	Description
0	Maximum Print Position disabled
1 - 255	Valid Maximum Print Position setting
*132	Factory default

Related parameters: #014 Lock Maximum Print Position
#019 Physical Maximum Print Position at 10 CPI

#012 Left Margin

Defines the column for the first horizontal print position.

Value	Description
0 - 255	The column for the leftmost character
*1	Factory default

Note: 1. If column 0 is defined, it is treated as column 1.

#014 Lock Maximum Print Position

If set to Yes, the Maximum Print Position defined in parameter #011 cannot be overridden by the Set Horizontal Format command.

Value	Description
*no	The Set Horizontal Format command may set Maximum Print Position
yes	Maximum Print Position setting from the host is ignored

Related parameter: #011 Maximum Print Position

#015 ASCII Character Set

Determines which EBCDIC-To-ASCII Character Translation Table that should be used.

Value	Description	Value	Description
0	US ASCII	20	Arabic (864) <i>Note 3</i>
1	Swedish/Finnish	21	Hebrew (862) <i>Note 3</i>
2	Danish/Norwegian	22	Greece (869) <i>Note 3</i>
3	German/Austrian	23	Turkey (857) <i>Note 3</i>
4	UK English	24	Hebrew old (862) <i>Note 3</i>
5	Italian	25	Cyrillic (855) <i>Note 3</i>
6	French/Belgian	26	East Europe (852) <i>Note 3</i>
7	Spanish	27	Greek (851) <i>Note 3</i>
8	Japanese	28	Thai (874) <i>Note 3</i>
9	PC-8 (Code Page 437)		
10	Roman-8		
11	PC-850 (Code Page 850)		
12	Xerox 3700		

- Notes:*
1. The default character set depends on the currently selected Printer Driver.
 2. Setting this parameter doesn't automatically cause the character set to be selected in the printer. It's recommended to include a sequence in parameter #090 that selects the correct character set at each power up.
 3. These ASCII character sets are optional.

#016 Color String to Send at Power Up

The setting refers to parameter #130 to parameter #136 and determines which of them that shall be sent to the printer at power up.

Value	Description
0 - 6	Refers to one of the parameters #130 to #136
*7	No Color String is sent at power up

Related parameters: #130 Color 1 to #136 Color 7

#017 UDS-String to Send at Power Up

The setting refers to parameter #120 to parameter #129 and determines which of them that shall be sent to the printer at power up.

Value	Description
0 - 9	Refers to one of the parameters #120 to #129
*10	No UDS-String is sent at power up

Related parameters: #120 UDS 1 to #129 UDS 10

#018 Text Width Mode

Used for adjusting text when the number of characters on a line exceeds the Maximum Print Position set by the Set Horizontal Format command or parameter #011, or when the number of characters on a line exceeds the Physical Maximum Print Position defined in parameter #019.

Value	Description
*0	A line break is performed if the current print position exceeds the Maximum Print Position
1	A line break is performed if the current print position exceeds the Physical Maximum Print Position
2	The line is cut off if the current print position exceeds the Physical Maximum Print Position
3	The cpi setting is changed if necessary and the line is cut off if the current print position still exceeds the Physical Maximum Print Position

Related parameters: #011 Maximum Print Position
#019 Physical Maximum Print Position at 10 CPI

#019 Physical Maximum Print Position at 10 CPI

Defines the physical right limit beyond which no printing is allowed.

Value	Description
0 - 255	Valid Physical Maximum Print Position at 10 CPI
*132	Factory default

Related parameter: #018 Text Width Mode

#020 Monocase

If set to Yes, all text is printed with capital letters.

Value	Description
*No	Normal printing
Yes	All text is printed with capital letters

#021 Simulated Line Feed

If set to Yes, a Carriage Return is sent to the printer before the Line Feed sequence. Then the current print position is restored.

Value	Description
*No	Only the Line Feed sequence is sent to the printer when the Line Feed command comes from the host
Yes	Carriage Return is issued before the Line Feed sequence and the current print position is restored afterwards

Related parameters: #060 Carriage Return control character
#061 Line Feed control character

#024 Bottom Margin

The form length is reduced with the number of lines defined in this parameter. The Form Feed, produced when the current print line exceeds the form length, is so then issued earlier if this parameter is set to a value greater than 0.

Value	Description
0-255	Number of lines to reduce form length with
*0	Factory default

Related parameter: #001 Form Length

#026 IBM Printer

Designates which IBM printer the protocol converter should emulate. The parameter setting only determines the printer ID response from the protocol converter to the host and doesn't affect how the SCS commands are handled.

Value	Description
*0	IBM 4214 model 2
1	IBM 5256 model 1, 2 and 3
2	IBM 5224 model 1 and 2
3	IBM 5225 model 1, 2, 3 and 4
5	IBM 4230 model 101 (Applies to the AXIS 330 Cobra only)

#028 Time Before Off-Line

See "Parameters (3812/5219 Emulation Only)" on page 79.

#029 Lock Form Length

If set to Yes, the Form Length defined in parameter #001 cannot be overridden by the Set Vertical Format command.

Value	Description
*no	The Set Vertical Format command may set Form Length
yes	Form Length setting from the host is ignored

Related parameter: #001 Form Length

#031 Baudrate

Does not apply to the Axis 330 Cobra. See “#031 Baud Rate” on page 80.

#032 Word Size

Does not apply to the Axis 330 Cobra. See “#032 Word Size” on page 80.

#033 Parity

Does not apply to the Axis 330 Cobra. See “#033 Parity” on page 80.

#034 Stop Bits

Does not apply to the Axis 330 Cobra. See “#034 Stop Bits” on page 80.

#035 XON/XOFF

Does not apply to the Axis 330 Cobra. See “#035 XON/XOFF” on page 81.

#036 XON Character

Does not apply to the Axis 330 Cobra. See “#036 XON Character” on page 81.

#037 XOFF Character

Does not apply to the Axis 330 Cobra. See “#037 XOFF Character” on page 81.

#038 Inverted Busy

Does not apply to the Axis 330 Cobra. See “#038 Inverted Busy” on page 81.

#039 PC-Host Time-out

Does not apply to the Axis 330 Cobra. See “#039 PC-Host Time-out” on page 81.

#040 Escape Character

See “#040 Escape Character” on page 82.

#041 Transparency Lead-In Sequence

See “#041 Transparency Lead-In Sequence” on page 82.

#042 Configuration Lead-In Sequence

See “#042 Configuration Lead-In Sequence” on page 83.

#043 Transparency/Configuration Trailer Sequence

See “#043 Transparency/Configuration Trailer Sequence” on page 83.

#044 Extended Emulation Control Sequence

See “#044 Extended Emulation Control Sequence” on page 84.

#045 Job Timeout

See “#045 Job Time-out” on page 84.

#046 Start of Job Sequence

See “#046 Start of Job Sequence” on page 84.

#047 Resend PC-Host String

Does not apply to the Axis 330 Cobra.

Host-PC Serial String (#059) or Host-PC Parallel String (#065) are sent if new data is recieved from the PC and PC-Host Time-out (#039) has expired.

Value	Description
*No	The strings are not sent. <i>(default)</i>
Yes	Resend strings

<i>Related parameters:</i>	#039 PC-Host Time-out	#064 Host-PC Parallel String
	#058 PC-Host String	#065 PC-Host TOF String
	#059 Host-PC Ser. String	

#053 Bar Code Driver

Selects the graphics driver used for bar code printing.

Value	Description
0	Off (bar code printing disabled)
1	IBM Proprinter/Epson FX
2	Epson LQ/Fujitsu DPL24C
8	HP-PCL

- Notes:*
1. The default value depends on the selected Printer Driver.
 2. If the Bar Code Driver is set to 0 (Off), an attempt to print bar code data results in an error message (ERROR NO: BE - BAR CODE ERROR).

Related parameter: #054 Bar Code Attributes

#054 Bar Code Attributes

Controls the appearance of printed bar code data.

Value	Description
*0	Normal
1	Thin
2	Bold
3	Thin and Bold

- Notes:*
1. The 'Thin' attribute reduces the bar width by 1/120 of an inch without affecting the overall width. This attribute is effective only when the horizontal expansion factor is set to 2 or greater, see function #211, section 10.
 2. The 'Bold' attribute results in a more dense printout by printing the bar code data twice.
 3. For the HP-PCL driver the 'Thin' attribute reduces the bar width by 1/240" and the 'Bold' attribute increases the bar width by 1/360". The 'Thin and Bold' attribute has no effect.

Related parameter: #053 Bar Code Driver

#055 LAC with Bit Image-Graphics

Enables graphics printing with the Load Alternate Character command.

Value	Description
0	Disable the LAC command
1	Adjust graphics data for correct character density (10 cpi or 15 cpi)
2	Print graphics data 1:1 in 120 dpi (12 cpi instead of 15 cpi)
3	Print graphics data 1:1 in 240 dpi (24 cpi instead of 15 cpi)

- Notes:*
1. The default value depends on the selected Printer Driver.
 2. A setting of 2 or 3 keeps the correct proportions of the printed image but distorts the cpi. These settings can be helpful if there is a readability problem with a bar code.

Related parameters: #056 Double Density Bit-Image Graphics
#057 Quad Density Bit-Image Graphics

#056 Double Density Bit-Image Graphics

Escape sequence for starting graphics printing in 120 dots per inch (dpi).

Value	Description
<any seq>	Sequence for 120 dpi bit-image graphics
<empty>	The LAC command may not be enabled

- Note:*
1. The default value depends on the selected Printer Driver.

Related parameter: #055 LAC with Bit-Image Graphics

#057 Quad Density Bit-Image Graphics

Escape sequence for starting graphics printing in 240 dots per inch (dpi).

Value	Description
<any seq>	Sequence for 240 dpi bit-image graphics
<empty>	The LAC command may not be enabled

- Note:*
1. The default value depends on the selected Printer Driver.

Related parameter: #055 LAC with Bit-Image Graphics

#058 PC-Host String

Does not apply to the Axis 330 Cobra.

The contents of this string is sent to the printer each time the PC-Host Sharing function switches from PC input to host input.

Value	Description
<any seq>	ASCII data sequence to be sent
<empty>	Factory default (PC-Host String disabled)

*Related
parameters:*

#039 PC-Host Time-out

#064 Host-PC Parallel String

#047 Resend PC-Host String

#065 PC-Host TOF String

#059 Host-PC Serial String

#059 Host-PC Serial String

Does not apply to the Axis 330 Cobra.

The contents of this string is sent to the printer each time the PC-Host Sharing function switches from host input to PC serial input.

Value	Description
<any seq>	ASCII data sequence to be sent
<empty>	Factory default (Host-PC Ser. String disabled)

*Related
parameters:*

#039 PC-Host Time-out

#064 Host-PC Par. String

#047 Resend Host-PC String

#065 PC-Host TOF String

#058 PC-Host String

#060 Carriage Return

Escape sequence for performing a Carriage Return in the printer.

Value	Description
<any seq>	Carriage Return escape sequence
*\$0D	Factory default

#061 Line Feed

Escape sequence for performing a Line Feed in the printer.

Value	Description
<any seq>	Carriage Return escape sequence
*\$0A	Factory default

#062 Form Feed

Escape sequence for performing a Form Feed in the printer.

Value	Description
<any seq>	Carriage Return escape sequence
*\$0C	Factory default

#063 Header String

See “Parameters (3812/5219 Emulation Only)” on page 79.

#064 Host-PC Parallel String

Does not apply to the Axis 330 Cobra. See “Parameters (3812/5219 Emulation Only)” on page 79.

#065 PC-Host TOF String

Does not apply to the Axis 330 Cobra. See “Parameters (3812/5219 Emulation Only)” on page 79.

#066 Set Top of Form

Escape sequence for setting Top of Form in the printer.

Value	Description
<any seq>	Escape sequence for Top of Form
<empty>	No Top of Form is set in the printer

Note: 1. The default value depends on the selected Printer Driver.

#070 Form Length Header

When the Set Vertical Format command is received from the host, the protocol converter immediately starts to translate the vertical format setting to an equivalent form length setting in the printer. The first step in that translation is to send the contents of this parameter to the printer.

Value	Description
<any seq>	First part of the escape sequence for form length setting
<empty>	No start sequence for form length setting is sent to the printer

Note: 1. The default value depends on the selected Printer Driver.

Related parameters: #071 Form Length Format
#072 Form Length Tail

#071 Form Length Format

This parameter consists of four hexadecimal bytes that together determine how the form length shall be set in the printer. The meaning of each byte is listed below.

Form Length Format Byte 1:

Value	Description
\$01	The form length is set in number of lines
\$02	The form length is set in number of inches
\$03	No form length setting is done in the printer but parameter #062 is used to perform form feeds
\$04	The Vertical Format Unit method is used to set the form length
\$00, \$05 - \$FF	No form length setting is done in the printer and Form Feeds are simulated with a number of Line Feeds

Form Length Format Byte 2:

Value	Description
\$01	The setting in the printer is done with a binary value (one byte)
\$02	The setting in the printer is done with two significant digits of a decimal value
\$03	The setting in the printer is done with a three digits decimal value
\$04	If the form length is to be set in number of inches (Form Length Format Byte 1 = \$02), the form length is multiplied by the contents of Form Length Byte 3 and by 10 before setting is done with decimal digits.
\$00, \$05 - \$FF	No form length setting is done in the printer and Form Feeds are simulated with a number of Line Feeds

Form Length Format Byte 3:

Value	Description
\$00 - \$FF	If the form length shall be set in number of inches (Form Length Format Byte 1 = \$02), the form length is multiplied with the value of this byte before setting is done in the printer

Form Length Format Byte 4:

Value	Description
\$00 - \$FF	This byte is used as an offset that is added to the form length value just before it is set in the printer

Note: 1. The default values depend on the selected Printer Driver.

Related parameters: #070 Form Length Header
#072 Form Length Tail

#072 Form Length Tail

After the Form Length Header sequence has been sent to the printer and the form length value has been set according to the Form Length Format parameter, the Form Length Tail sequence is sent to the printer.

Value	Description
<any seq>	Last part of the escape sequence for form length setting
<empty>	No ending sequence for form length setting is sent to the printer

Note: 1. The default value depends on the selected Printer Driver.

Related parameters: #070 Form Length Header
#071 Form Length Format

#075 Quality 1 (Draft Quality)

#076 Quality 2 (Near Letter Quality)

#077 Quality 3 (Fast Draft)

#078 Quality 4

These parameters contain sequences for selection of print quality and are triggered at power up by the Print Quality parameter or by the Page Presentation Media command from the host.

Value	Description
<any seq>	ASCII data sequence for selection of print quality
<empty>	No selection sequence will be sent (print quality selection disabled)

Note: 1. The default sequences depend on the selected Printer Driver.

Related parameter: #005 Print Quality

#080 Line Density Header

When the Set Line Density command is received from the host, the protocol converter immediately starts to translate the line density setting from the host to an equivalent setting in the printer. The first step in that translation is to send the contents of this parameter to the printer.

Value	Description
<any seq>	First part of the escape sequence for line density setting
<empty>	No start sequence for line density setting is sent to the printer

Note: 1. The default value depends on the selected Printer Driver.

Related parameters: #081 Line Density Format
#082 Line Density Tail

#081 Line Density Format

This parameter consists of four hexadecimal bytes that together determine how the line density shall be set in the printer. The meaning of each byte is listed below.

Line Density Format Byte 1:

Value	Description
\$01	The setting in the printer is done with a binary value (one byte)
\$02	The setting in the printer is done with two significant digits of a decimal value
\$03	The setting in the printer is done with a three digits decimal value
\$00, \$04 - \$FF	No line density setting is done in the printer

Line Density Format Byte 2:

Value	Description
\$00	Parameter #083 or parameter #084 is used to set line density
\$01 - \$FF	The numerator that together with the denominator (Line Density Format Byte 3) defines the scaling of line density from 1/1440 of an inch to the resolution appropriate for the line density escape sequence sent to the printer (e.g. a numerator of 1 and a denominator of 20 is appropriate if the line density should be set in units of 1/72 of an inch in the printer since $1440/20 = 72$)

Line Density Format Byte 3:

Value	Description
\$00	Parameter #083 or parameter #084 is used to set line density
\$01 - \$FF	The denominator that together with the numerator (Line Density Format Byte 2) defines the scaling of line density from 1/1440 of an inch to the resolution appropriate for the line density escape sequence sent to the printer (e.g. a numerator of 1 and a denominator of 20 is appropriate if the line density should be set in units of 1/72 of an inch in the printer since $1440/20 = 72$)

Line Density Format Byte 4:

Value	Description
\$00 - \$FF	This byte is used as an offset that is added to the line density value just before it is set in the printer

Note: 1. The default values depend on the selected Printer Driver.

Related parameters:

#080 Line Density Header	#083 6 LPI
#082 Line Density Tail	#084 8 LPI

#082 Line Density Tail

After the Line Density Header sequence has been sent to the printer and the line density value has been set according to the Line Density Format parameter, the Line Density Tail sequence is sent to the printer.

Value	Description
<any seq>	Last part of the escape sequence for line density setting
<empty>	No ending sequence for line density setting is sent to the printer

Note: 1. The default value depends on the selected Printer Driver.

Related parameters: #080 Line Density Header
#081 Line Density Format

#083 6 LPI

When byte 2 and/or byte 3 of the Line Density Format parameter is set to 0, the sequence for selecting 6 lpi in the printer is used to simulate host settings of 3, 6, 12, 18 and 32 lpi.

Value	Description
<any seq>	Sequence for selection of 6 lpi in the printer
<empty>	No selection of 6 lpi is done in the printer

Note: 1. The default value depends on the selected Printer Driver.

Related parameter: #081 Line Density Format

#084 8 LPI

When byte 2 and/or byte 3 of the Line Density Format parameter is set to 0, the sequence for selecting 8 lpi in the printer is used to simulate host settings of 4, 8, 16 and 24 lpi.

Value	Description
<any seq>	Sequence for selection of 8 lpi in the printer
<empty>	No selection of 8 lpi is done in the printer

Note: 1. The default value depends on the selected Printer Driver.

Related parameter: #081 Line Density Format

#085 5 CPI**#086 10 CPI****#087 12 CPI****#088 15 CPI****#089 16.7 CPI**

These parameters contain sequences for selection of character density and are triggered at power up by the Character Density parameter, or by the Set Character Density command from the host.

Value	Description
<any seq>	ASCII data sequence for selection of character density
<empty>	No selection sequence is sent (character density selection disabled)

Note: 1. The default sequences depend on the selected Printer Driver.

Related parameter: #002 Character Density

#090 Power-Up Sequence

See “Parameters (3812/5219 Emulation Only)” on page 79.

#091 Micro Step Right

Used by the Printer Drivers for laser printers to accomplish a small displacement of text when simulated boldface is triggered by a backward positioning from the host.

Value	Description
<any seq>	Sequence for relative move right at simulated boldface
<empty>	Simulated boldface disabled

Note: 1. The default sequence depends on the selected Printer Driver.

#092 Micro Step Left

Used by the Printer Drivers for laser printers to reset the displacement of text, made by the Micro Step Right parameter, when simulated boldface should be turned off.

Value	Description
<any seq>	Sequence for relative move left at end of simulated boldface
<empty>	Reset of simulated boldface disabled

Note: 1. The default sequence depends on the selected Printer Driver.

#095 Continuous Form

Selects continuous form (tractor feed) in the printer and can only be triggered at power up (if parameter #004 is set to 0).

Value	Description
<any seq>	ASCII data sequence for selection of Continuous Form
<empty>	No selection sequence is sent

Note: 1. The default sequence depends on the selected Printer Driver.

Related parameter: #004 Feeder Type

#096 Sheet Feeder 1**#097 Sheet Feeder 2****#098 Sheet Feeder 3 (Envelope)****#099 Single Sheet**

These parameters are used for selection of paper source in the printer.

Value	Description
<any seq>	ASCII data sequence for selection of paper source
<empty>	No selection sequence will be sent (sheet feeder selection disabled)

Note: 1. The default sequences depend on the selected Printer Driver.

#110 Character Substitute 1**#111 Character Substitute 2****#112 Character Substitute 3****#113 Character Substitute 4****#114 Character Substitute 5****#115 Character Substitute 6****#116 Character Substitute 7****#117 Character Substitute 8****#118 Character Substitute 9****#119 Character Substitute 10**

Each of these parameters can contain a string that may replace an ASCII character.

Value	Description
<any seq>	ASCII data sequence replacing an ASCII character
<empty>	Factory default

- Note:* 1. To use a substitute sequence, a character in the Editable Set must have been programmed to a value in the range \$01 - \$0A. At translation from EBCDIC to ASCII, that value will refer to one of the character substitute sequences that will replace the original ASCII character.

Related parameter: #015 ASCII Character Set

#120 User Definable String 0

#121 User Definable String 1

#122 User Definable String 2

#123 User Definable String 3

#124 User Definable String 4

#125 User Definable String 5

#126 User Definable String 6

#127 User Definable String 7

#128 User Definable String 8

#129 User Definable String 9

These strings are reserved for customer use and may be programmed to contain data free of choice. One of these strings, chosen by parameter #017, is automatically sent at each power up.

Value	Description
<any seq>	ASCII data sequence
<empty>	Factory default

- Note:* 1. The contents of the User Definable Strings can be sent to the printer using a special syntax (see “User Definable Strings” on page 42).

Related parameter: #017 UDS-String to Send at Power Up

#130 Color 1

#131 Color 2

#132 Color 3

#133 Color 4

#134 Color 5

#135 Color 6

#136 Color 7

These strings are intended for selection of color. The string defined in parameter #016 is sent automatically at each power up.

Value	Description
<any seq>	ASCII data sequence for selection of color
<empty>	Factory default

Related parameter: #016 Color String to Send at Power Up

#150-#189 String Substitutions

Applies to the AXIS 330 Cobra+ and AX-3 Cobra+ (4214 mode) only.

Programming and use are described in “String Substitutions” on page 63

Value	Description
<any seq>	Any length an dcontent
<empty>	Factory default

SECTION 10

INTERNAL FUNCTIONS

This Section contains a summary of the internal functions available in the protocol converter. The general syntax for function calls is described in “Internal Function Calls” on page 37. An internal function call is only valid within a configuration sequence, as described in “Configuration from the System” on page 36.

Some of the functions are also accessible from the Configuration from a Terminal as described in the User’s Manual.

Internal Functions (3812/5219 Emulation Only), below, covers the functions available in 3812/5219 emulation mode and “Internal Functions (4214 Emulation Only)” on page 120 the functions available in 4214 emulation mode.

Internal Functions (3812/5219 Emulation Only)

#203 Edit EBCDIC-To-ASCII Character Translation Table

Besides four permanent character translation tables, there is an editable character translation table, Editable Set. Before editing has been made, the Editable Set is equal to the PC-850 translation table. Editing with function #203 always affects the Editable Set even if this translation table isn’t the currently selected.

The changes made with function #203 are not visible until the Editable Set is selected as the overall character set (“Modification of the Character Translation Table” on page 46), or a font is activated that uses the Editable Set (“Changing the ASCII Character Set for a Font” on page 60).

Syntax: `=203 , <EBCDIC1> , <ASCII1> [, <EBCDIC2> , <ASCII2> . <EBCDICn> , <ASCIIn>]`

- <EBCDIC_n> is the EBCDIC to ASCII table positions.
- <ASCII_n> is the ASCII character code values.

- Notes:*
1. The EBCDIC to ASCII table positions range from \$40 to \$FF.
 2. For 3812/5219 emulation ASCII character code values in the range \$01-\$05 select Character Substitute 1-5 (parameters #110-#114).

#204 Save EBCDIC-To-ASCII Character Translation Table

Function #204 saves the Editable Set in permanent memory so that changes made with function #203 remains after power off.

Syntax: `=204`

#205 Save Current Configuration

Function #205 saves all parameters in the parameter list and the Editable Set in permanent memory so that changes made with parameter programming and function #203 remains after power off.

Syntax: =205

#206 Initialize Printer

Function #206 performs a Warm Start, *i.e.* the protocol converter and the printer are initialized to the power on status.

Syntax: =206

#207 Load Printer Driver

Function #207 loads a new Printer Driver, overriding the current configuration. Section 8 lists the available Printer Drivers. An invalid Printer Driver number results in loading of the default driver.

Syntax: =207

#211 Define Bar Code

Applies to the Axis 330 Cobra only (optional on the AX-3 Cobra+).

Function #211 specifies the Bar Code type and size for subsequent Bar Code printouts.

Syntax: =211 , <BT><MW><BH><RT><HP>

- <BT> is the Bar Code Type.
- <MW> is the Module Width in multiples of 1/120".
- <BH> is the Bar Code Height in multiples of 1/6".
- <RT> Human Readable Text.
- <HP> is the Horizontal Start Position in multiples of 1/12".

Valid selections for Bar Code Type (BT):

Value	Description
1	Code 39
3	UPC-A
8	EAN 8
9	EAN 13
12	2 of 5 Interleaved
13	Codabar Matrix
*17	Code 128

***Applies to the AX-3 Cobra+ and AXIS 330 Cobra only.**

Valid selections for Module Width (MW) in multiples of 1/120":

Value	Description
1 - 32	Minimum Module Width 1/120", maximum Module Width 32/120"

Valid selections for Bar Code Height (BH) in multiples of 1/6":

Value	Description
1 - 32	Minimum Bar Code Height 1/6", maximum Bar Code Height 32/6"

Valid selections for Human Readable Text (RT):

Value	Description
0	No text
1	Text immediately below bar code
2	Text below bar code with a blank line between

Valid selections for Horizontal Start Position (HP) in multiples of 1/12":

Value	Description
1 - 255	Leftmost Start Position 1/12", rightmost Start Position 255/12"

#212 Print Bar Code Data

Applies to the Axis 330 Cobra only.

Function #212 prints bar code data as specified by function #211.

Syntax: `=212,"<ASCII literals to be printed as bar code data>"`

#220 Reset

Hard reset of the protocol converter. Equivalent to power on/off of the protocol converter. Note that host communication will be temporarily lost.

Syntax: `=220`

#222 Print EBCDIC International Set 5 Table

Prints the EBCDIC International Set 5 Table depending on the selected printer driver.

Syntax: `=222`

#228 Print Parameter List

Prints the complete configuration.

Syntax: `=228`

#231 Print Software Header

Prints software revision information.

Syntax: `=231`

#232 Print Name of Current Printer Driver

Prints the name of the current printer driver.

Syntax: `=232`

#239 Print Test Printout

Prints test printout. This gives the same result as setting the rotary switch to position 9 at power on. See also appendix A, “Start Conditions” on page 142.

Syntax:

= 239

#254 Wait until printer is ready

This function waits until the printer is ready. This can be useful with some printers before making internal test printouts.

Syntax:

= 254

Internal Functions (4214 Emulation Only)

#203 Edit EBCDIC-To-ASCII Character Translation Table

Editing with function #203 affects the currently selected character translation table and takes immediate effect.

Syntax: `=203 , <EBCDIC1> , <ASCII1> [, <EBCDIC2> , <ASCII2> , <EBCDICn> , <ASCIIn>]`

- <EBCDIC_n> is the EBCDIC to ASCII table positions.
- <ASCII_n> is the ASCII character code values.

Example: See “Modification of the Character Translation Table” on page 46.

- Notes:*
1. The EBCDIC to ASCII table positions range from \$40 to \$FF.
 2. For 4214 emulation ASCII character code values in the range \$01-\$0A select Character Substitute 1-10 (parameters #110-#119).

#204 Save EBCDIC-To-ASCII Character Translation Table

Function #204 saves the current character translation table in permanent memory so that changes made with function #203 remains after power off.

Syntax: `=204`

#205 Save Current Configuration

Function #205 saves all parameters in the parameter list and the currently selected character translation table in permanent memory so that changes made with parameter programming and function #203 remains after power off.

Syntax: `=205`

#206 Initialize Printer

See “Internal Functions (3812/5219 Emulation Only)” on page 116.

#207 Load Printer Driver

See “Internal Functions (3812/5219 Emulation Only)” on page 116.

#211 Define Bar Code

Function #211 specifies the Bar Code type and size for subsequent Bar Code printouts.

Syntax: `=211 , <BT><MW><BH><RT><HP>`

- <BT> is the Bar Code Type.
- <MW> is the Module Width in multiples of 1/120".
- <BH> is the Bar Code Height in multiples of 1/6".
- <RT> Human Readable Text.
- <HP> is the Horizontal Start Position in multiples of 1/12".

Valid selections for Bar Code Type (BT):

Value	Description
1	Code 39
3	UPC-A
8	EAN 8
9	EAN 13
12	2 of 5 Interleaved
13	Codabar Matrix
*17	Code 128

* Applies to the AX-3 Cobra+ and the Axis 330 Cobra only.

Valid selections for Module Width (MW) in multiples of 1/120":

Value	Description
1 - 32	Minimum Module Width 1/120", maximum Module Width 32/120"

Valid selections for Bar Code Height (BH) in multiples of 1/6":

Value	Description
1 - 32	Minimum Bar Code Height 1/6", maximum Bar Code Height 32/6"

Valid selections for Human Readable Text (RT):

Value	Description
0	No text
1	Text immediately below bar code
2	Text below bar code with a blank line between

Valid selections for Horizontal Start Position (HP) in multiples of 1/12":

Value	Description
1 - 255	Leftmost Start Position 1/12", rightmost Start Position 255/12"

#212 Print Bar Code Data

Function #212 prints bar code data as specified by function #211.

Syntax: `=212,"<ASCII literals to be printed as bar code data>"`

#220 Reset

See "Internal Functions (3812/5219 Emulation Only)" on page 116.

#222 Print EBCDIC International Set 5 Table

See “#222 Print EBCDIC International Set 5 Table” on page 118.

#228 Print Parameter List

See “#228 Print Parameter List” on page 118.

#231 Print Software Header

See “#231 Print Software Header” on page 122.

#232 Print Name of Current Printer Driver

See “#232 Print Name of Current Printer Driver” on page 118.

#239 Print Test Printout

See “#239 Print Test Printout” on page 119.

#254 Wait until printer is ready

See “#254 Wait until printer is ready” on page 119.

SECTION 11

CHARACTER TABLES

This section contains the following character tables:

Code Page (System Language) Character Tables		Page
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273	German/Austrian	125
274	Belgian	126
275	Brazilian	127
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278	Finnish/Swedish	130
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500	International Set 5	132
280	Italian	133
281	Japanese English	134
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284	Spanish Speaking	136
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ASCII Symbol Sets:

ASCII Symbol Set Character Tables	Page
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US English/Canadian

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	ˆ	{	}	\	0
-1		é	/	É	a	j	˜	£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	ä	ï	Å	Ĩ	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	¢	!	!	:	«	»	¡	[-	¹	²	³
-B	.	\$,	#	»	º	¿]	ô	û	Ô	Û
-C	<	*	%	@	ð	æ	Ð	ˆ	ö	ü	Ö	Ü
-D	()	_	'	ý	,	Ý	ˆ	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	Ó	Ú
-F		¬	?	"	±	□	®	=	õ	ÿ	Õ	

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German/Austrian

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	¢	ä	ü	Ö	0
-1		é	/	É	a	j	ß	£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	{	ë	[	Ë	c	l	t	.	C	L	T	3
-4	à	è	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	@	E	N	V	5
-6	ā	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	â	ï	Ä	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	˘	Ñ	˙	i	r	z	¾	I	R	Z	9
-A	Ä	Ü	ö	:	α	β	ι	¬	-	¹	²	³
-B	.	\$,	#	»	º	¿	ı	ô	û	Ô	Û
-C	<	*	%	§	ð	æ	Ð	ˉ	:	}	\]
-D	()	_	'	ý	,	Ý	"	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	Ó	Ú
-F	!	^	?	"	±	α	®	≡	õ	ÿ	Ö	

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Belgian

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	¢	é	è	ç	0
-1		{	/	É	a	j	"	£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	.	C	L	T	3
-4	@	}	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	â	ï	Å	Ĩ	g	p	x	¼	G	P	X	7
-8	\	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	[]	ù	:	«	»	ı	¬	-	ı	2	3
-B	.	\$,	#	»	º	¿		ô	û	Ô	Û
-C	<	*	%	à	ð	æ	Ð	-	ö	ü	Ö	Ü
-D	()	_	'	ý	,	Ý	-	ò	ı	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	Ó	Ú
-F	!	^	?	"	±	□	®	=	õ	ÿ	Õ	

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Brazilian

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	¢	õ	é	\	0
-1		}	/	[a	j	˘	£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ã	ë	Ã	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	`	î	@	Î	f	o	w	¶	F	O	W	6
-7	â	ï	Â	Ï	g	p	x	¼	G	P	X	7
-8	ı	ì]	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	ã	i	r	z	¾	I	R	Z	9
-A	É	\$	ç	:	«	»	ı	¬	-	1	2	3
-B	.	Ç	,	Õ	»	º	¿	ı	ô	û	Ô	Û
-C	<	*	%	Ã	ð	æ	Ð	˘	ö	ü	Ö	Ü
-D	()	_	'	ý	.	Ý	"	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	Ó	Ú
-F	!	^	?	"	±	□	®	=	{	ÿ	#	

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Canadian French

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	[`	ø	é	è	ç	0
-1		{	/	É	a	j	"	#	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	.	C	L	T	3
-4	@	}	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	]	E	N	V	5
-6	ā	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	\	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	µ	i	r	z	¾	I	R	Z	9
-A	°	§	ù	:	«	»	¡	¬	-	¹	²	³
-B	.	\$,	£	»	º	¿	ı	ô	û	Ô	Û
-C	<	*	%	à	ð	æ	Ð	ˆ	ö	ü	Ö	Ü
-D	()	_	'	ý	.	Ý	˜	ò	ı	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	Ó	Ú
-F	!	^	?	"	±	□	®	≡	õ	ÿ	Õ	

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Danish/Norwegian

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	!	@	°	µ	¢	æ	å	\	0
-1		é	/	É	a	j	ü	£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ā	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	}	ï	\$	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	β	Ñ	`	i	r	z	¾	I	R	Z	9
-A	#	□	ø	:	«	»	¡	¬	-	1	2	3
-B	.	Å	,	Æ	»	»	¿	¡	ô	û	Ô	Û
-C	<	*	%	Ø	ø	{	Ð	-	ö	~	Ö	Ü
-D	()	_	'	ý	,	Ý	"	ò	ù	Ò	Ù
-E	+	;	>	=	þ	[Þ	'	ó	ú	Ó	Ú
-F	!	^	?	"	±]	®	=	õ	ÿ	Õ	

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Finnish/Swedish

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	¢	ä	å	É	0
-1		`	/	\	a	j	ü	£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	{	ë	#	Ë	c	l	t	.	C	L	T	3
-4	à	è	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	[	E	N	V	5
-6	ä	î	Ä	Î	f	o	w	¶	F	O	W	6
-7	}	ï	\$	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	é	i	r	z	¾	I	R	Z	9
-A	§	□	ö	:	«	»	ı	¬	-	ı	2	3
-B	.	Å	,	Ä	»	»	ı	ı	ô	û	Ô	Û
-C	<	*	%	Ö	ö	æ	Ð	-	ı	-	@	Ü
-D	(	)	_	'	ý	.	Ý	"	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	Ó	Ú
-F	!	^	?	"	±	ı	®	=	õ	ÿ	Õ	

Code Page 297

French

Hex Digits 1st 2nd	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	[	`	ç	é	è	ç	0
-1		{	/	É	a	j	"	#	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	.	C	L	T	3
-4	@	}	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	]	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	\	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	µ	i	r	z	¾	I	R	Z	9
-A	°	§	ù	:	«	»	¡	¬	-	¹	²	³
-B	.	\$	,	£	»	º	¿	ı	ô	û	Ô	Ù
-C	<	*	%	à	õ	æ	Ð	ˆ	ö	ü	Ö	Ü
-D	(	)	_	'	ý	.	Ý	˜	ò	ı	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	Ó	Ú
-F	!	^	?	"	±	□	®	=	õ	ÿ	Õ	

Code Page 500

International Set 5

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	¢	{	}	\	0
-1		é	/	É	à	j	˘	£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ă	ě	Ě	Ě	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ā	î	Ā	Î	f	o	w	¶	F	O	W	6
-7	â	ï	Ā	Ī	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	·	i	r	z	¾	I	R	Z	9
-A	[	]	!	:	«	»	¡	¬	-	1	2	3
-B	.	\$	,	#	»	º	¿	ı	ô	û	Ô	Û
-C	<	*	%	@	ð	æ	Ð	-	ö	ü	Ö	Ü
-D	(	)	_	'	ý	,	Ý	"	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	Ó	Ú
-F	!	^	?	"	±	□	®	=	õ	ÿ	Õ	

Note: 1. This is the default system language.

Code Page 280

Italian

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	[	μ	¢	à	è	ç	0
-1		]	/	É	a	j	ì	#	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	.	C	L	T	3
-4	{	}	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	@	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	\	˘	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	Ù	i	r	z	¾	I	R	Z	9
-A	°	é	ò	:	«	»	ı	¬	-	ı	²	³
-B	.	\$	,	£	»	º	¿	ı	ô	û	Ô	Û
-C	<	*	%	§	ð	æ	Ð	ˆ	ö	ü	Ö	Ü
-D	(	)	_	'	ý	,	Ý	"	ı	`	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	Ó	Ú
-F	!	^	?	"	±	□	®	=	õ	ÿ	Õ	

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	¢	{	}	\$	0
-1		é	/	É	a	j	-	[	A	J		1
-2	â	ê	Â	Ê	b	k	s	\	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	.	C	L	T	3
-4	à	è	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ĩ	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	£	!	!	:	«	»	¡	^	-	1	2	3
-B	.	¥	,	#	»	º	¿	]	ô	û	Ô	Û
-C	<	*	%	@	ð	æ	Ð	~	ö	ü	Ö	Ü
-D	(	)	_	'	ý	.	Ý	"	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	Ó	Ú
-F	|	¬	?	"	±	□	®	=	õ	ÿ	Õ	

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	¢	ã	'	Ç	0
-1		é	/	É	a	j	ç	£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	.	C	L	T	3
-4	à	è	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	{	î	#	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ˆ	ì	\	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	[	]	õ	:	«	ª	ı	¬	-	¹	²	³
-B	.	\$	,	Ã	»	º	¿	|	ô	û	Ô	Û
-C	<	*	%	Õ	ð	æ	Ð	ˆ	ö	ü	Ö	Ü
-D	(	)	_	'	ý	.	Ý	ˆ	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	}	ó	ú	Ó	Ú
-F	!	^	?	"	±	□	®	=	ı	ÿ	@	

Code Page 284

Spanish Speaking

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	ø	{	}	\	0
-1		é	/	É	a	j	ˆ	£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ā	î	Ā	Î	f	o	w	¶	F	O	W	6
-7	â	ï	Å	Ĩ	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ı	ß	#	`	i	r	z	¾	I	R	Z	9
-A	[	]	ñ	:	«	»	ı	ˆ	-	1	2	3
-B	.	\$	,	Ñ	»	º	¿	!	ô	û	Ô	Û
-C	<	*	%	@	ð	æ	Ð	ˆ	ö	ü	Ö	Ü
-D	(	)	_	'	ý	,	Ý	ˆ	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	ˆ	ó	ú	Ó	Ú
-F	|	¬	?	"	±	□	®	=	õ	ÿ	Õ	

Code Page 285

UK English

Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	¢	{	}	\	0
-1		é	/	É	a	j	˘	[	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	.	C	L	T	3
-4	à	è	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	˙	i	r	z	¾	I	R	Z	9
-A	\$	!	!	:	«	»	|	^	-	1	2	3
-B	.	£	,	#	»	º	¿	]	ô	û	Ô	Ù
-C	<	*	%	@	ð	æ	Ð	˘	ö	ü	Ö	Ü
-D	(	)	_	'	ý	,	Ý	˘	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	Ó	Ú
-F	|	¬	?	"	±	□	®	=	õ	ÿ	Õ	

PC Set 2 (Code Page 437)

ASCII Symbol Set

Hex Digits 1st → 2nd ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0				0	@	P	`	p	Ç	É	á	⌘	⌘	⌘	α	≡
-1			!	1	A	Q	a	q	ü	æ	í	■	⌘	⌘	β	±
-2			"	2	B	R	b	r	é	Æ	ó	⌘	⌘	⌘	Γ	≥
-3			#	3	C	S	c	s	â	ô	ú	|	|	⌘	π	≤
-4			\$	4	D	T	d	t	ä	ö	ñ	|	-	⌘	Σ	ƒ
-5			%	5	E	U	e	u	à	ò	Ñ	|	+	⌘	σ	J
-6			&	6	F	V	f	v	å	û	®	|	|	⌘	μ	+
-7			'	7	G	W	g	w	ç	ù	º	|	|	⌘	τ	≈
-8			(	8	H	X	h	x	ê	ÿ	¿	|	⌘	⌘	Φ	°
-9			)	9	I	Y	i	y	ë	Ö	¬	|	⌘	⌘	θ	.
-A			*	:	J	Z	j	z	è	Ü	¬	|	⌘	⌘	Ω	.
-B			+	;	K	[	k	{	ï	ø	½	|	⌘	■	δ	√
-C			,	<	L	\	l	|	î	£	¼	|	⌘	■	∞	ⁿ
-D			-	=	M	]	m	}	ì	¥	¡	|	=	■	φ	²
-E			.	>	N	^	n	~	Ã	ℙ	«	|	⌘	■	€	■
-F			/	?	O	_	o	□	À	f	»	|	⌘	■	∩	

Note: 1. This is the most common 8 bit symbol set.

PC-850 (Code Page 850)

ASCII Symbol Set

Hex Digits 1st → 2nd ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0				0	@	P	`	p	Ç	É	á	█	Ł	ø	Ó	-
-1			!	1	A	Q	a	q	ü	æ	í	█	Ł	Ð	ß	±
-2			"	2	B	R	b	r	é	Æ	ó	█	Ł	Ê	Ô	==
-3			#	3	C	S	c	s	â	ô	ú	|	Ł	Ë	Ò	¾
-4			\$	4	D	T	d	t	ä	ö	ñ	Ł	Ł	È	õ	¶
-5			%	5	E	U	e	u	à	ò	Ñ	Á	Ł	É	Ö	§
-6			&	6	F	V	f	v	â	û	ª	Â	ā	Í	µ	÷
-7			'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	,
-8			(	8	H	X	h	x	ê	ÿ	¿	©	Ł	Ï	ƒ	°
-9			)	9	I	Y	i	y	ë	Ï	®	Ł	Ł	Ĵ	Ú	"
-A			*	:	J	Z	j	z	è	Ü	¬	Ł	Ł	ŕ	Û	.
-B			+	;	K	[	k	{	ĩ	ø	½	Ł	Ł	█	Ù	¹
-C			,	<	L	\	l	|	î	£	¼	Ł	Ł	█	Ý	³
-D			-	=	M	]	m	}	ì	Ø	¡	¢	=	ì	Ý	²
-E			.	>	N	^	n	~	Ä	×	“	¥	Ł	ì	-	■
-F			/	?	O	_	o	□	Å	f	”	Ł	□	■	´	

Note: 1. This symbol set is used by the HP LaserJet III printer driver.

Roman-8

ASCII Symbol Set

Hex Digits 1st → 2nd ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0				0	@	P	`	p				-	â	Å	Á	Þ
-1			!	1	A	Q	a	q			À	Ý	ê	î	Ã	þ
-2			"	2	B	R	b	r			Â	ý	ô	ø	ä	·
-3			#	3	C	S	c	s			È	°	û	Æ	Ð	µ
-4			\$	4	D	T	d	t			Ê	Ç	á	à	õ	¶
-5			%	5	E	U	e	u			Ë	ç	é	í	í	¾
-6			&	6	F	V	f	v			Î	ì	ó	ø	ì	-
-7			'	7	G	W	g	w			Ï	Ñ	ú	æ	Ó	¼
-8			(	8	H	X	h	x			´	ñ	à	Ä	Ò	½
-9			)	9	I	Y	i	y			`	¿	è	ì	Õ	¾
-A			*	:	J	Z	j	z			^	¤	ò	Ö	õ	º
-B			+	;	K	[	k	{			"	£	ù	Ü	Š	«
-C			,	<	L	\	l	|			~	¥	ä	É	š	■
-D			-	=	M	]	m	}			Ù	§	ë	ï	Ú	»
-E			.	>	N	^	n	~			Û	f	ö	ß	ÿ	±
-F			/	?	O	_	o	■			£	¢	ü	Ô	ÿ	

Note: 1. This symbol set is used by the HP LaserJet II printer driver.

APPENDIX A

THE FRONT PANEL

The front panel of the protocol converter family of protocol converters has three indicators (POWER, SYSTEM and PC SHARE) and a rotary switch.

The front panel of the Axis 330 Cobra protocol converter has two indicators (POWER and SYSTEM) and a rotary switch.

The switch is used for accessing certain functions. In normal print operation it should be set to the device address.

The POWER Indicator

The indicator (green) is lit when the protocol converter is switched on.

The SYSTEM Indicator

The indicator (green) is lit when the protocol converter is connected to the IBM system. It can also flash under the following conditions:

- Flash during three seconds at power up.
- Flash in test mode (see below).
- Rapid flash during test function execution.

Note: 1. If the power up flashing continues, a hardware error has occurred.

The PC SHARE Indicator

Does not apply to the Axis 330 Cobra.

This indicator (yellow) is lit during a PC printout. Any job from the host will be put on waiting during the PC printout and for subsequent delay time set by parameter #039 (PC-Host Time-out).

The Rotary Switch

The ten-position rotary switch is used to set the device address for the protocol converter. It is also used to set start conditions and to select and execute test functions during operation.

Start Conditions The action when the protocol converter is switched on will be determined by the setting of the rotary switch.

Start conditions for the protocol converter:

Position	Description
0 - 6	Device address during normal print operation
7	Reserved
8	Set IBM printer emulation (4214)
9	Perform a test printout

Device Address Follow these steps to change the device address:

Switch the protocol converter off.

Select a new device address (positions 0 - 6).

Switch the protocol converter on.

A warning for change of device address is printed.

Step the rotary switch one position forward and back.

The new device address is confirmed by a printed message.

Test Mode Test mode is reached from normal print operation. It is used to access a number of internal functions. Normal print operation is inhibited.

Set the rotary switch to position '9'.

When the SYSTEM indicator starts to flash, you can select one of the following test mode functions below.

Test mode functions:

Position	Test Mode Function
0	Restart - same as power off/power on
1	Set Factory Defaults - abandon the current configuration - See Note
2	Print Character Translation Table - the current EBCDIC International Set1 5-To-ASCII character translation table
3	ASCII Hex Dump Mode - trap the outgoing data stream and print characters and control codes as hexadecimal values
4	System Hex Dump Mode - trap the incoming data stream and print characters and control codes as hexadecimal values
5	Reserved
6	Changes between 3812/5219 and 4214 emulation - See page 144. Applies to the AXIS 330 only.
7	Configuration from a Terminal - run the configuration utility. See the User's Manual
8	Print Parameter List - print the complete configuration
9	Exit Test Mode - resume normal print operation

Note: 1. Remember to set the rotary switch to the device address for normal print operation. Switch the protocol converter off and on.

Note: **Apply to the AXIS 330 only.**

To set factory default configuration requires a two-step operation to avoid accidental activation and loss of configuration settings:

1. Set the rotary switch to position '1'.
2. Within 2 seconds, set the rotary switch to position '2'.

**Select IBM
Printer
Emulation (4214
only)**

You can select IBM Printer Emulation by using the rotary switch. Proceed as follows:

Turn the protocol converter off. Note the current device address.

Select position '8' on the rotary switch.

Turn the protocol converter on.

A printed message indicates the current IBM Printer Emulation.

Press the printer's ONLINE/OFFLINE key twice to change emulation.

The new emulation is confirmed by a printed message. Repeat until the requested emulation is reached.

Turn the protocol converter off to save the current emulation.

Set the device address and turn the protocol converter on.

**Select IBM
Printer
Emulation
(Change
Emulation
Laser/Matrix)**

This section applies to the Axis 330 Cobra only.

The factory default emulation of the AXIS 330 Cobra is IBM 3812/5219 laser printer. You can easily change the emulation to IBM 4214 matrix printer using the rotary switch.

1. **Set the rotary switch to position '9'.** Wait until the SYSTEM indicator flashes.
2. **Set the rotary switch to position '6'.** Wait until the SYSTEM indicator flashes rapidly.
3. **Set the rotary switch to '4' to select 4214 emulation, or to '5' to select 3812/5219 emulation.** Wait a few seconds until the SYSTEM indicator flashes slower.
4. **Switch off the AXIS 330 Cobra.** (Switch off the printer or unplug the external power supply).
5. **Set the rotary switch to position '9'(test printout)**
6. **Switch on the AXIS 330 Cobra.** (switch on the printer or plug in the external power supply).

A test printout will be made:

Printout:

```
***** TEST PRINTOUT *****
AXIS 330 Cobra 4214 Ver 1.00 960103
Printer Driver: #30 Generic Printer
IBM Printer Emulation_____ IBM 4214 model 2
System Language_____ International Set 5
ASCII Char. Set_____ US ASCII
```

- Notes:*
1. Error Message E2 will be printed and should be ignored.
 2. The AXIS 330 Cobra is automatically set to factory default state (your configuration is lost) when changing between 3812/5219 and 4214 emulation.

APPENDIX B

COMPATIBILITY WITH OTHER PRODUCTS

The protocol converter is designed to directly replace one of the emulated IBM printers. When replacing other printers or protocol converters, problems may arise when these products diverge from the IBM specifications.

If the protocol converter to be replaced utilizes non-standard command code interpretation, the printout from the protocol converter may look different. The way to solve this problem is to modify the host application to fit IBM specifications.

Another area of difficulties is when configuration commands for a protocol converter are included into the application. Since all converters have their way of configuration, the application needs to be modified.

This is a good reason for keeping configuration files separated from the applications. Such embedded commands could also control font, print orientation selection, etc, although the IBM system supports such functions using standard IBM commands. In these cases it is recommended to use the IBM way, but may require a re-write of the print application. Not only will you be able to print it on all protocol converters, but also on an IBM printer, with the full application support.

In most cases it is possible to replace another non-Axis product. The AX-3 Cobra+ has a programmable transparency, which is the most common non-IBM function used with a protocol converter. In “Redefinition of the Lead-In and Trailer Sequences” on page 43, Redefinition of the Lead-in and Trailer Sequences, an example shows how this can be done.

APPENDIX C

CABLES

CI - AX-3 Cobra+ Cables

This Section describes the pin-configuration for the different cables that can be used with the AX-3 Cobra+.

Overview

There are five different cables available for connecting the AX-3 Cobra+ to the printer and optionally to parallel or serial PC or LAN connections. The possible configurations are listed below:

Part No.	Description	PC-Host Sharing		Serial Protocol	
		Serial PC	Parallel PC	Cobra+ to Printer	PC to Cobra+
12755	Parallel Printer	No	No	N/A	N/A
12756	Serial Printer	No	No	Rdy/Bsy or Xon/Xoff	N/A
12757	Serial Printer, Serial PC	Yes	No	Rdy/Bsy	Rdy/Bsy
12758	Parallel Printer, Serial/Parallel PC	Yes	Yes	N/A	Rdy/Bsy or Xon/Xoff
12998	Parallel Printer, Parallel PC	No	Yes	N/A	N/A

- Note:** 1. The AX-3 Cobra+ PC-Host sharing cannot be used to connect a parallel PC or LAN to a serial printer.

Centronics Parallel Printer Cable

Centronics parallel printer cable (P/N 12755):

44 pin male connector (AX-3 Cobra+)		36 pin centronics connector (printer)	
1	-PR_STB	1	-STROBE
2	PR_DATA 0	2	DATA 0
3	PR_DATA 1	3	DATA 1
4	PR_DATA 2	4	DATA 2
5	PR_DATA 3	5	DATA 3
6	PR_DATA 4	6	DATA 4
7	PR_DATA 5	7	DATA 5
8	PR_DATA 6	8	DATA 6
9	PR_DATA 7	9	DATA 7
10	-PR_ACK	10	-ACK
11	PR_BUSY	11	BUSY
12	PR_PE	12	PE
13	PR_SELECT	13	SELECT
18	+5 V	18	+5 V
19	+5 V	18	+5 V
20	GND	19	GND
21	GND	20	GND
42	-PR.INIT	31	-INIT
41	-PR.ERR	32	-ERROR

RS-232 Serial Printer Cable

RS-232 Serial printer cable (P/N 12756):

44 pin male connector (AX-3 Cobra+)	25 pin male connector (printer)
22 RECEIVE	2 TRANSMIT
23 TRANSMIT	3 RECEIVE
25 CTS	20 CTS
20 GND	7 GND
18 +5 V	N/C (can be connected to +5V, 200mA)
┌ 9 PR_DATA 7	
└ 13 PR_SELECT	
┌ 12 PR_PE/SER_BUSY	
└ 26 SER_BUSY	

PC-Host Sharing Cable (Serial Printer, Serial PC)

PC-Host Sharing cable (P/N 12757):

44 pin male connector (AX-3 Cobra+)	25 pin male connector (printer)
23 TRANSMIT	3 RECEIVE
25 CTS	20 CTS
20 GND	7 GND
18 +5 V	N/C (can be connected to +5V, 200mA)
44 pin male connector (AX-3 Cobra+)	25 pin female connector (PC)
22 RECEIVE	2 TRANSMIT
24 DTR OUT	5 CTS
24 DTR OUT	6 DSR
21 GND	7 GND
┌ 9 PR_DATA 7	┌ 8 DCD
└ 13 PR_SELECT	└ 20 DTR
┌ 12 PR_PE/SER_BUSY	
└ 26 SER_BUSY	

PC-Host Sharing Cable (Parallel Printer, Serial/Parallel PC)

PC-Host Sharing Cable (P/N 12758) - Centronics connector:

44 pin male connector (AX-3 Cobra+)	36 pin centronics connector (printer)
1 -PR_STB	1 -STROBE
2 PR_DATA 0	2 DATA 0
3 PR_DATA 1	3 DATA 1
4 PR_DATA 2	4 DATA 2
5 PR_DATA 3	5 DATA 3
6 PR_DATA 4	6 DATA 4
7 PR_DATA 5	7 DATA 5
8 PR_DATA 6	8 DATA 6
9 PR_DATA 7	9 DATA 7
10 -PR_ACK	10 -ACK
11 PR_BUSY	11 BUSY
12 PR_PE	12 PE
13 PR_SELECT	13 SELECT
18 +5 V	18 +5 V
19 +5 V	18 +5 V
20 GND	19 GND
21 GND	20 GND
42 -PR.INIT	31 -INIT
41 -PR.ERR	32 -ERROR

PC-Host Sharing Cable (P/N 12758) - PC connectors:

44 pin male connector (AX-3 Cobra+)		25 pin female connector (PC)	
22	RECEIVE	2	TRANSMIT
23	TRANSMIT	3	RECEIVE
24	DTR OUT	5	CTS
24	DTR OUT	6	DSR
21	GND	7	GND
		8	DCD
		20	DTR
44 pin male connector (AX-3 Cobra+)		25 pin male connector (PC)	
27	-PC_STROBE	1	-STROBE
28	PC_DATA 0	2	DATA 0
29	PC_DATA 1	3	DATA 1
30	PC_DATA 2	4	DATA 2
31	PC_DATA 3	5	DATA 3
32	PC_DATA 4	6	DATA 3
33	PC_DATA 5	7	DATA 5
34	PC_DATA 6	8	DATA 6
35	PC_DATA 7	9	DATA 7
36	-PC_ACK	10	-ACKNLG
37	PC_BUSY	11	BUSY
38	PC_PE	12	PE
39	PC_SELECT	13	SELECT
20	GND	19	GND
21	GND	20	GND
40	-PC_INIT	16	-INIT
41	-PC_ERROR	15	-ERROR

PC-Host Sharing Cable (Parallel Printer, Parallel PC)

PC-Host Sharing Cable (P/N 12998) - Centronics connector:

44 pin male connector (AX-3 Cobra+)		36 pin centronics connector (printer)	
1	-PR_STB	1	-STROBE
2	PR_DATA 0	2	DATA 0
3	PR_DATA 1	3	DATA 1
4	PR_DATA 2	4	DATA 2
5	PR_DATA 3	5	DATA 3
6	PR_DATA 4	6	DATA 4
7	PR_DATA 5	7	DATA 5
8	PR_DATA 6	8	DATA 6
9	PR_DATA 7	9	DATA 7
10	-PR_ACK	10	-ACK
11	PR_BUSY	11	BUSY
12	PR_PE	12	PE
13	PR_SELECT	13	SELECT
18	+5 V	18	+5 V
19	+5 V	18	+5 V
20	GND	19	GND
21	GND	20	GND
42	-PR.INIT	31	-INIT
41	-PR.ERR	32	-ERROR

PC-Host Sharing Cable (P/N 12998) - PC connector:

44 pin male connector (AX-3 Cobra+)		25 pin male connector (PC)	
27	-PC_STROBE	1	-STROBE
28	PC_DATA 0	2	DATA 0
29	PC_DATA 1	3	DATA 1
30	PC_DATA 2	4	DATA 2
31	PC_DATA 3	5	DATA 3
32	PC_DATA 4	6	DATA 3
33	PC_DATA 5	7	DATA 5
34	PC_DATA 6	8	DATA 6
35	PC_DATA 7	9	DATA 7
36	-PC_ACK	10	-ACKNLG
37	PC_BUSY	11	BUSY
38	PC_PE	12	PE
39	PC_SELECT	13	SELECT
20	GND	19	GND
21	GND	20	GND
40	-PC_INIT	16	-INIT
41	-PC_ERROR	15	-ERROR

C2 - AX-3 Cobra+ Built In Connector Cables

This section describes the pin-configuration for the different cables that can be used with the AX-3 Cobra+ built in connector cables.

Overview There are three different cables available for connecting the AXIS OKI HD, AX-4039 and AX-7 Cobra+ OEM cables to parallel or serial PC or LAN connections. The possible configurations are listed below:

Part No.	Description	PC-Host Sharing Serial PC/LAN	PC-Host Sharing Parallel PC/LAN
12513	Serial PC/LAN	Yes	No
12514	Parallel PC/LAN	No	Yes
12516	Serial/Parallel PC/LAN	Yes	Yes

PC-Host Sharing cable (Serial PC)

PC-Host Sharing cable (P/N 12513):

20 pin high density connector (Axis OKI HD, AX-4039 and Axis Cobra+ OEM kit.)		25 pin female connector (PC)	
1	RECEIVE	2	TRANSMIT
2	TRANSMIT	3	RECEIVE
3	DTR	5	CTS
		6	DSR
4	GND	7	GND
		8	DCD
		20	DTR

PC-Host Sharing cable (Parallel PC)

PC-Host Sharing cable (P/N 12514):

20 pin high density connector (AXIS OKI-HD, AX-4039 and AXIS Cobra+ OEM kit.)		25 pin male connector (PC)	
4	GND	18-25	GND
5	-STB	1	-STROBE
6	BUSY	11	BUSY
7	PE	12	PE
8	INDATA0	2	DATA 0
9	INDATA1	3	DATA 1
10	INDATA2	4	DATA 2
11	INDATA3	5	DATA 3
12	INDATA4	6	DATA 4
13	INDATA5	7	DATA 5
14	INDATA6	8	DATA 6
15	INDATA7	9	DATA 7
16	SELECT	13	SELECT
20	-ACK	10	-ACK

PC-Host Sharing cable (Serial/Parallel PC)

PC-Host Sharing cable (P/N 12516):

20 pin high density connector (AXIS OKI-HD, AX-4039 and AXIS Cobra+ OEM kit.)		25 pin female connector (PC)	
1	RECEIVE	2	TRANSMIT
2	TRANSMIT	3	RECEIVE
3	DTR	5	CTS
		6	DSR
4	GND	7	GND
		8	DCD
		20	DTR
20 pin high density connector (AXIS OKI-HD, AX-4039 and AXIS Cobra+ OEM kit.)		25 pin male connector (PC)	
4	GND	18-25	GND
5	-STB	1	-STROBE
6	BUSY	11	BUSY
7	PE	12	PE
8	INDATA0	2	DATA 0
9	INDATA1	3	DATA 1
10	INDATA2	4	DATA 2
11	INDATA3	5	DATA 3
12	INDATA4	6	DATA 4
13	INDATA5	7	DATA 5
14	INDATA6	8	DATA 6
15	INDATA7	9	DATA 7
16	SELECT	13	SELECT
20	-ACK	10	-ACK

C3 - AXIS 330 Cobra Cables

This section describes the pin-configuration for the different cables that can be used with the AXIS 330 Cobra.

Overview There are one cable available for connecting the AXIS 330 Cobra to the printer. The possible configuration are listed below:

Part No.	Description
13522	Printer Cable extension

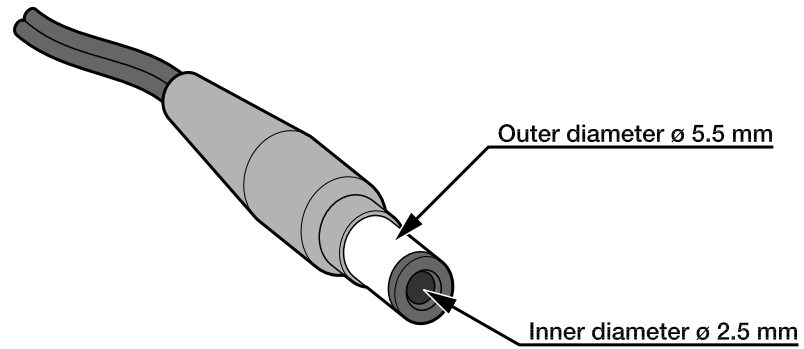
Printer Cable Extension

Printer Cable Extension (P/N 13522):

36 pin centronics female connector (AXIS 330 Cobra)		36 pin centronics male connector (printer)	
1	-STROBE	1	-STROBE
2	DATA 0	2	DATA 0
3	DATA 1	3	DATA 1
4	DATA 2	4	DATA 2
5	DATA 3	5	DATA 3
6	DATA 4	6	DATA 4
7	DATA 5	7	DATA 5
8	DATA 6	8	DATA 6
9	DATA 7	9	DATA 7
10	-ACK	10	-ACK
11	BUSY	11	BUSY
12	PE	12	PE
13	SELECT	13	SELECT
14	-AUTO FEED	14	-AUTO FEED
18	+5V	18	+5V
19-30	GND	19-30	GND
31	-INIT	31	-INIT
32	-ERROR	32	-ERROR
36	-SELECT IN	36	-SELECT IN

Power Connector

If power is supplied from an external source, a Japanese power plug with dimensions according to the illustration below should be used.



APPENDIX D

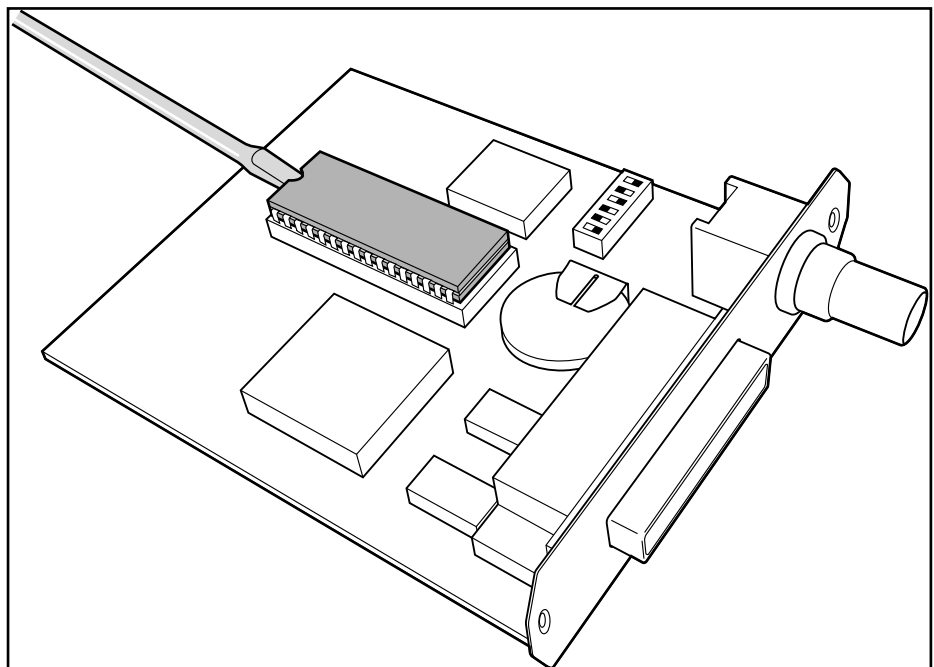
UPGRADING FIRMWARE

Does not apply to the Axis 330 Cobra.

The AX-3 Cobra+ firmware can be upgraded by replacing the EPROM chip located inside the unit. To replace the EPROM, proceed as follows:

Caution: The AX-3 Cobra+ circuit board is static-sensitive. Mishandling may cause permanent damage to its components. Make sure to take all recommended precautions related to static-sensitive devices.

1. **Turn off the AX-3 Cobra+** by removing the power supply connector.
2. Disconnect the system and printer connections.
3. Unscrew the two screws on the back panel.
4. **Gently pull the back panel.** The attached circuit board with the EPROM will slide out of the box.



5. **Gently remove the EPROM from its socket** using a flat screwdriver. *It is very important to insert the screwdriver from the edge facing the front panel.* See above illustration. If the screwdriver is inserted the wrong way, the battery could be short-circuited, causing permanent damage to the unit.

6. **Carefully insert the new EPROM chip into the socket.** The notch on the top of the chip should face the front panel. Make sure that all of the EPROM pins align with the socket and gently press the chip down.

Note: There are two sizes of EPROM (24 and 28 pin) that work with the AX-3 Cobra+. If you are installing a 24 pin EPROM it should be positioned at the side of the socket that is closest to the back panel, leaving four empty connectors in the socket at the front panel side.

7. Push the circuit board back into position inside the box.
8. Tighten the two screws on the back panel.
9. **Attach the AX-3 Cobra+ to the printer and make a test printout.** (See “Control Codes Common to 4214 and 3812/5219 Emulation” on page 17.) Please note that all user configurations will be lost and that the following error message will be printed as a normal consequence of a firmware upgrade:

E2-PERMANENT MEMORY CHECKSUM ERROR, FACTORY DEFAULTS SET

10. **Attach the AX-3 Cobra+ to the system.** (See “Additional Control Codes for 3812/5219 Emulation” on page 23)

Dip switch positions

Does not apply to the Axis 330 Cobra.

11. Except for switch 5, the switch positions should not be altered on the DIP switch located on the circuit board. The correct positions are:

Switch no.	Position
1	on
2	off
3	on
4	off
5	on=4214 emulation off=3812/5219 emulation
6	on

Updating the Software

Applies to the Axis 330 Cobra only.

Software that can be updated

- The Axis 330 Cobra software held in Flash ROM

All software updates are free of charge.

Checking if an update is available

Contact your dealer to check if there has been any new issues of the software. You should have your present version numbers ready to compare against the latest software issues from Axis.

Alternatively you may wish to check the Axis WWW Home Page at **<http://www.axis.com/>**, where you can down-load the latest version of the software utilities. You can also get files and information through anonymous ftp: log into **ftp.axis.com** and go to the /pub/axis directory.

***Updating the Axis
330 Cobra Flash
ROM***

You can carry out an update to your Flash ROM:

- through the parallel printer port of the Axis 330 Cobra. A special cable is needed to do this.

Full instructions on how to carry out the update will be supplied with the software update kit. Part number: 14518.

Flash ROM

This is a special type of memory chip in the Axis 330 Cobra that controls the printing operations. Just like a normal ROM its contents are unaffected when the power is turned off. What makes it special is that its memory contents can be replaced during an update sequence; this will upgrade your Axis 330 Cobra's performance without having to replace any physical components.

APPENDIX E

TECHNICAL SPECIFICATIONS

Attachments

- IBM System/34
- IBM System/36
- IBM System/38
- IBM System AS/400
- IBM 5259 Migration Data Link
- IBM 5294 Control Unit
- IBM 5394 Control Unit
- IBM 5494 Control Unit
- IBM 5251 Model 12 Control Unit
- IBM 5299 Terminal Multiconnector

IBM Printer Emulations (3812/5219 Emulation Only)

- IBM 3812 with 5219 emulation software
- IBM 3816 01S/01D with 5219 emulation software

IBM Printer Emulations (4214 Emulation Only)

- IBM 4214 model 2
- IBM 5256 model 1, 2 and 3
- IBM 5224 model 1 and 2
- IBM 5225 model 1, 2, 3 and 4
- *IBM 4230 model 101

***Applies to the Axis 330 Cobra only.**

IBM System Features

- SCS and FFT Data Stream
- Page Presentation Media
- Cut Sheet Feeder Command
- Virtual Printer PC/Support
- Host Print Transform
- Multiple Bin Support
- 14 National Languages

Additional System Features (3812/5219 Emulation Only)

- Computer Output Reduction and Automatic Page Rotation
- FGID Font Selection Support
- Duplex
- Fixed-Pitch, Proportional and Typographic Font Support

Additional System Feature (4214 Emulation Only)

- Graphics Support Through LAC

AX-3 Cobra+ Features

- Configuration from a Terminal or from the System
- Editable Character Translation Table
- Intelligent 3-way PC-Host Sharing (parallel or serial PC) - AX-3 Cobra+ only
- 10 User definable Strings
- Programmable Transparency Function (data pass-through)

Additional AX-3 Cobra+ Feature (3812/5219 Emulation Only)

- 5 Predefined Printer Drivers, fully editable, Bar Codes (optional in the AX-3 Cobra+, standard in the Axis 330 cobra), String Substitutions (optional in the AX-3 Cobra+, standard in the Axis 330 cobra)

AX-3 Cobra+ Features (4214 Emulation Only)

- 20 Predefined Printer Drivers, fully editable, Bar Codes, String Substitutions

Hardware Specifications

AX-3 Cobra+

- Size: 100x25x90 mm / 4.0"x1.0"x3.5"
- Weight: 0.25 kg / 0.55 lb
- Power: Max 170mA at 5V DC supplied via Centronics cable, or 200mA at 9V AC / 12V DC via optional External Power Supply Approvals
EMI: FCC 15B class A, CE: EN 50081-1, EN 50082-1
- Safety: EN 60950, UL, CSA. Approved power supply for all countries.

Axis 330 Cobra

- Size: 29x55x100 mm / 1.2"x2.2"x4.0"
- Weight: 0.15 kg / 0.3 lb
- Power: 5 VDC, min 170mA from printer parallel port or Axis Power Supply PS-A, 9 VAC, min 300mA.

Environments

- Temp.: 5 - 40°C / 40 - 105°F
- Humidity: 20 - 80 % non-condensing

All specifications are subject to change without prior notice

APPENDIX F

HOW TO CONTACT AXIS

Technical Support If you need technical support, please contact your dealer. If they can't help you, they will forward your request to us.

Axis on-line service

Use the Axis on-line service at any time to retrieve electronically distributed items. The material available includes the AX-3 Cobra+ Technical Reference, the Adobe Acrobat Reader (required for all Axis on-line documentation), company and product presentations, etc. All items are available on Internet by a WWW browser or FTP file transfer.

Internet and World Wide Web

If you are connected to Internet, have a look at the Axis WWW Home Page at **<http://www.axis.com/>**. You can find information here about the company and our products. You can also down-load on-line manuals, tools such as the Acrobat Reader for different platforms, and the latest versions of the software utilities. You can also get files and information through anonymous FTP: log in to **[ftp.axis.com](ftp://ftp.axis.com)** and go to the /pub/axis directory, or enter **<ftp://ftp.axis.com/pub/axis>** in your WWW browser.

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APPENDIX G

RELATED DOCUMENTATION

Related documentation:

Title	Part No.
AX-3 Cobra+ User's Manual	12853
IBM 5250 Information Display System Planning and Site Preparation Guide	GA21-9337
IBM Cabling System Planning and Installation Guide	GA27-3361
Using the IBM Cabling System with Communication Products	GA27-3620
IBM 5299 Terminal Multiconnector model 3 Planning, Setup and Maintenance Guide	GA27-3749
IBM System/36 Functions Reference Guide	SA-21-9436-05
IBM AS/400 Utilities: BGU User's Guide and Reference	SC09-1167-02
IBM AS/400 Programming: Guide to Programming for Printing	SC21-8194-0
IBM AS/400 Printing	GG24-3452-00
IBM AS/400 Programming: Advanced Printer Function Guide	SC21-9668-0
IBM 5219 Printer Model D01/D02 Programmer's Reference Guide	GA23-1025-0
Document Content Architecture Final-Form-Text Reference	SC23-0757-1
IBM 3812 and 3816 Page Printers Font Reference	GA34-2111-1
IBM 3816 Page Printer Programming Reference for AS/400, S/36 or S/38	GA34-2084-2
IBM 4214 Printer Model 2 Product Description	GC31-2582-1
Axis 330 Cobra User's Manual	14335

GLOSSARY

3812/3816	IBM 12/24 ppm page printer that uses LED technology.
4214	IBM medium-speed matrix printer.
5219	IBM 24-60 cps daisy wheel printer.
5224	IBM 30-560 lpm matrix printer.
5225	IBM high speed matrix printer.
5250	5250 Information Display System, the IBM twinax environment.
argument	An expression that is passed to a function for evaluation.
APF	Advanced Printer Function. AS/400 utility providing support for advanced printer functions.
AS/400	Application System/400. IBM's mid-range processor computers aimed to replace IBM System/3x.
ASCII	American Standard Code for Information Interchange. Originally a 7-bit character set, but also a common term for the various 8-bit character sets used in the IBM PC environment (as opposed to EBCDIC for example).
AXIS	A protocol converter company.
bar code	Machine readable information coded with alternating black and white bars.
binary	A system of numbers with the base two. Binary digits are 0 and 1.
bit	One of the digits in a binary value.
buffer	A temporary storage unit.
byte	8 bits.
cable through	A feature allowing multiple work stations to be connected to a particular line.
character codes	The codes representing printable characters. EBCDIC character codes are \$40 to \$FF.
code page	A term for a certain character table.
cold start	The Power Up sequence (parameter #90) is sent to the printer followed by printer setup of the initial printing environment. A cold start occurs only at power up.
configuration from a terminal	A method allowing the AX-3 Cobra+ to be configured with menus displayed on an attached twinax terminal.

configuration from the system	A method allowing the AX-3 Cobra+ to be configured with a setup document sent from the attached host.
control codes	Codes used for printer control, e.g. Carriage Return and Form Feed. SCS control codes are \$00 to \$3F.
COR	Computer Output Reduction. Printout in landscape orientation with reduced horizontal and vertical spacing.
delimiter	A character that marks the beginning or end of a unit of data.
device address	The rotary switch setting during normal operation of the AX-3 Cobra+.
duplex	Printing on both sides of a sheet.
EBCDIC	Extended Binary-Coded Decimal Interchange Code.
emulation	Imitation. For example when the AX-3 Cobra+ imitates an IBM 3812/5219 printer.
extended emulation	A method of accessing AX-3 Cobra+ functions not available in standard IBM environment.
FGID	Font Global IDentifier.
fix	A botch to repair a problem.
font	An assortment of characters of a given size and style.
hexadecimal	A system of numbers with the base 16. Hexadecimal digits are 0 - 9 and a - f (A - F).
hexdump	Printout of bytes represented by their hexadecimal values in plain language.
host	The primary or controlling computer in the twinax environment.
Host Print Transform	The SCS to ASCII translation is done on the host and only ASCII data is sent to the AX-3 Cobra+.
IBM	International Business Machines. A computer company.
IEEE	Institute for Electrical and Electronic Engineers with substantial impact on standards for communications.
kopplingsdosa	Swedish nickname for AXIS protocol converters.
landscape	Print orientation for documents with a width greater than the depth.
LSB	Least Significant Bit.
MSB	Most Significant Bit.
octet	IEEE term for a byte.
OS/400	The operating system for the AS/400.

parameter list	A listing from the AX-3 Cobra+ with the complete configuration.
pc/host sharing	A feature allowing the AX-3 Cobra+ to be shared between a twinax host and a PC.
pitch	A unit of width of a character.
portrait	Print orientation for documents with a depth greater than the width.
printer driver	All parameters in the configuration and the program routines in the AX-3 Cobra+ that controls the data sent to the attached printer.
protocol	A set of rules governing the communication and transfer of data between two or more devices in a communications system.
PTF	Program Temporary Fix. An official IBM temporary fix.
SCS	SNA Character String.
SNA	System Network Architecture.
transparency	Passing data from the application to the printer without any processing.
twinax	Twinaxial cable. The standard medium for connecting 5250 devices.
warm start	The printer and AX-3 Cobra+ are setup for the initial printing environment.

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